Engineering News, December 21, 1961

Registered at the G.P.O as a newspaper

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ENGINEERING NEWS

THE NEWSPAPER OF INDUSTRY • A HEYWOOD PUBLICATION

No. 12 December 21, 1961

Every Thursday, Price 4d

Trims mild steel, cast iron, hard plastics, gun-metal, etc
INDUSTRIAL TOOL with the New 'Blue' Blade by SURFORM
Blade an invention of Firth Brown Tools Ltd.

FBI survey reports complaints from engineering concerns

FIRMS CRITICISE RESEARCH

Associations remote from problems and progress is slow

REMOTENESS from practical problems and slowness of work are among criticisms of Research Associations levelled by engineering firms in a survey of industrial research carried out by the Federation of British Industries. There was, says the FBI report, "some suggestion of a fundamental inadequacy in the facilities."

Engineering companies also made the criticisms that no outside organisations were interested in the development of metal-cutting tools, and that the Department of Scientific and Industrial Research laboratories gave poor advice or inadequate assistance on some questions.

The setting-up of the Machine Tool Industry Research Association, announced while the inquiry was in progress, may go some way towards meeting the complaint in respect of cutting tools.

Services are inadequate

A large engineering firm replied to the questionnaire: "Accepting that this country must export quality products the services rendered are not sufficiently extensive. The problem appears to be basically the absence of adequate criteria by which to judge the necessary financial support for research".

Three other companies stressed the need for more research and advice upon instrumentation.

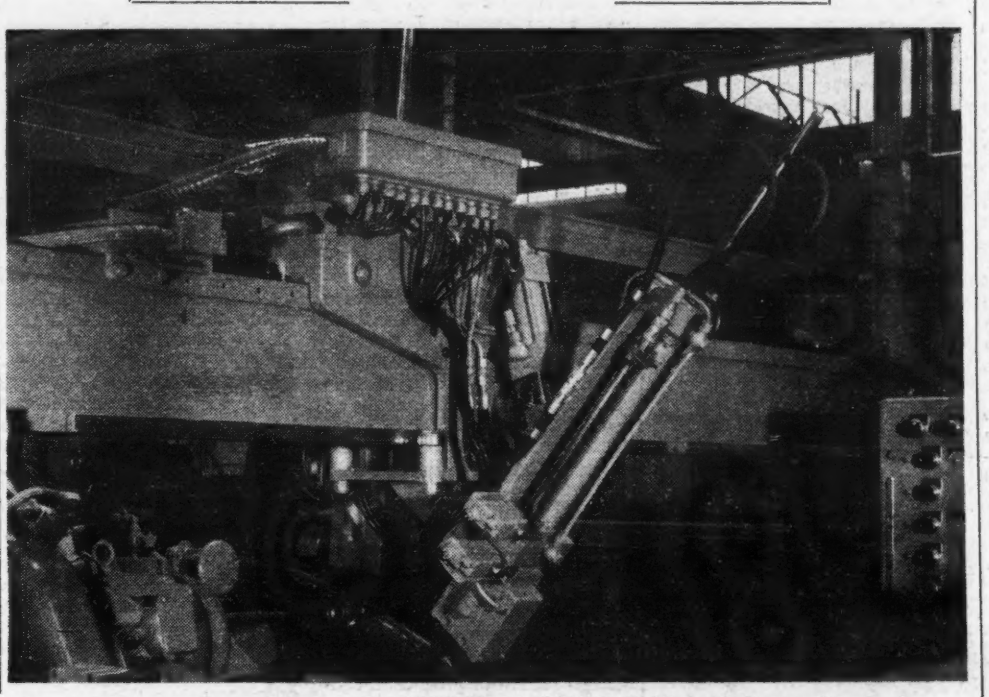
Of all the member firms who replied to the FBI inquiry, covering the vast majority of manufacturing industry in Britain, 139 (excluding aircraft concerns) commented on research organisations.

The number making critical comments was 43 and 20 of these came from the metals, non-electrical engineering and vehicle industries.

One of the most encouraging elements in the report (*Industrial Research in Manufacturing Industry, 1959/60*, price two guineas from the FBI and the National Institute of Social and Economic Research who took a joint part in the survey) is that two-thirds of the engineering companies and almost half the iron and steel firms reported plans for expanding research and development.

R and D is hampered by the shortage, averaging 14 per cent, of qualified scientists and engineers. In iron and steel the vacancy ratio was 30 per cent and in engineering 26 per cent.

Automated grinders
UNIT MACHINES SAVE SPACE



Newall-Keighley unit-built cylindrical grinding machine is shown here with automatic electro-hydraulic work loading and transfer equipment.

UNIT-BUILT grinding machines with demountable wheelheads, centre units, control panels, and work-transfer mechanisms are now available from The Newall Engineering Co., Peterborough.

The wheelhead units can be bolted to a common base casting at a desired angle for grinding diameters, or shoulders, or both simultaneously on shafts and similar components.

A hydraulic control unit for operating the machine can be bolted to the front, or one end of the base casting according to the requirements of the operator. This facility is also convenient when a machine forms part of a transfer line and floor space is at a premium.

The automatic conveyor and loading mechanism feeds components to the machine by conveyor and a travelling overhead carriage, fitted with extending arms, loads and unloads the workpieces.

The arms are fitted with jaws

● back page, column 6

AEI has £14m. order

AN order worth nearly £14 million has been received by Associated Electrical Industries from the CEGB for 2,000MW of generating plant.

It comprises four 500 MW, 3,000 r.p.m. single axis turbine-generators, condensing plants and turbine driven boiler feed pumps. The plant will be installed at Eggborough power station on the river Aire four miles from Knottingly, Yorks.

Reheat steam

The 500MW unit consists of a five-cylinder, reheat turbine for steam inlet conditions of 2,300 p.s.i.g. 1050° F., the steam being reheated after the first high pressure cylinder to this temperature.

The turbine is directly coupled to a 500MW two-pole generator.

A quantity of steam is tapped off the turbine after the high pressure cylinder to supply one of about 15,000 bhp output which drives the main boiler feed pump.

The generator is designed for 3 phase, 50 cycles/sec., 22,000 volts, 0.85 power factor and 0.4 short circuit ratio.

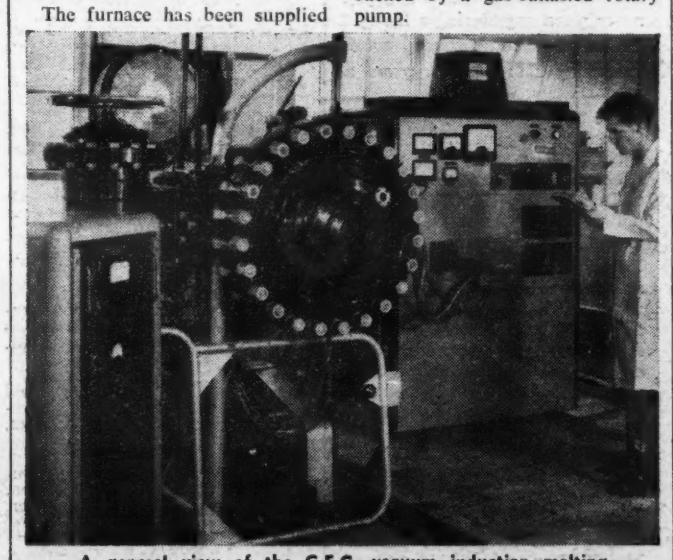
BISRA INSTALLS VACUUM FURNACE

TO ASSIST research into vacuum melting and casting of ferrous metals, a vacuum induction melting furnace is now operating at the Sheffield laboratories of the British Iron and Steel Research Association.

Optimum temperatures and pressures needed to remove impurities are being studied together with the effect of reduced and elevated pressure on steel-making reactions.

The furnace has been supplied by G.E.C. (Engineering) and with a melting capacity of 10lb. can operate at pressures up to 200lb./sq. in. and a maximum temperature of 1700 deg. C.

A 24in. diameter furnace chamber is located horizontally, and by means of a side handle the charge can be poured into a mould by tilting the crucible. Evacuation of the chamber is by a two-stage pumping system comprising a 10in. oil booster-diffusion pump backed by a gas-ballasted rotary pump.



A general view of the G.E.C. vacuum induction melting furnace installed at the B.I.S.R.A. Laboratories, Sheffield.

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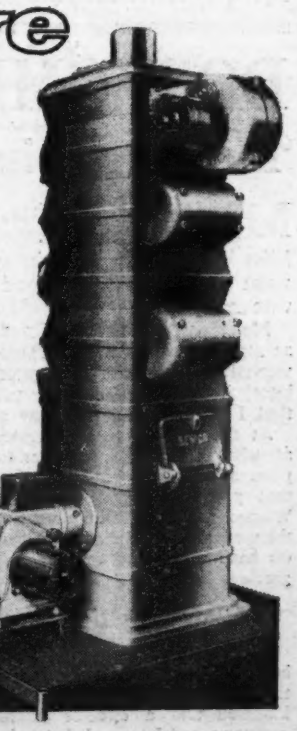
A Merry Christmas and a Happy New Year
from the editorial and advertising staffs of
ENGINEERING NEWS

Tangye
AUTOMATIC HEATING UNIT

Requiring the minimum of attention or maintenance, the Tangye automatic oil-fired heater is a most efficient and economical method of space heating. Three safety devices are incorporated which automatically come into operation in the event of either flame, electricity or fuel failure. Automatic re-start is by spark ignition on the restoration of supply. A thermostat is fitted and can be set to provide just the amount of heating required.



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YOUNG TOOL MAKERS WIN FREE TRIP TO SWITZERLAND

Lord Chandos (centre) presents an award to one of the apprentice winners in the Gauge and Tool Makers' Association's annual competition. Sir Stanley Harley is presenting a certificate.

FOUR apprentices whose efforts in the annual competition in craftsmanship and draughtsmanship organised by the Gauge and Tool Makers' Association were judged outstanding are to be sent on a visit to precision engineering works in Switzerland next Spring.

In announcing this at the annual Members' Luncheon in London last Tuesday the president of the Association, Sir Stanley Harley, Chairman of Coventry Gauge and Tool, said that there was a record number of entries for this year's competition and that the standard of work was exceptionally high.

All expenses for the visit to Switzerland are to be paid by the Gauge and Tool Makers' Educational Trust, established in 1960 for the benefit and assistance of craft apprentices in the gauge and tool industry.

Among the aims of the Trust are the furtherance of technical education for apprentices and students; to promote knowledge of the products of members of the Association; and to sponsor exhibitions and demonstrations in connection with the industry.

Prizes and certificates were presented at the end of the luncheon by Lord Chandos, Chairman of AEI, and there were more than 60 awards.

The president expressed his gratitude to Lord Chandos and his company for their practical assistance in connection with the competition. All entries were received at AEI's Rugby factory and reported on by the company's Inspection Department.

NEXT WEEK

MUST we adopt the metric system and fall in line with our neighbours? Or could we, with a little thought, evolve a system offering even great convenience? Colonel P. R. MacIver's article—Decimal Doubts—in next week's issue, states the case for a trigintimal system using 30 as the base.

Apart from the advantages to be gained from employing a base with six factors, of which three are prime numbers, a trigintimal system could be arranged to allow simple comparison with metric units.

Mr. E. F. Wooldridge, M.I.Mech.E., of United Steel's Research and Development Department, will write on some engineering aspects of recent developments in the iron and steel industry.

PEOPLE in the NEWS

MR. W. A. ADAM, NEW MANAGING DIRECTOR YALE AND TOWNE

THE appointment of **Mr. W. A. Adam** as managing director of the three British Divisions of the Yale and Towne Manufacturing Company has been announced by **Mr. H. P. Valentine,** president of Yale and Towne International, Inc.

Mr. Adam succeeds **Mr. J. T. McCarley** who has been appointed director of Manufacturing of the International operations of Yale and Towne, with headquarters in New York.

Mr. Adam gained his early, practical training at several well-

Mr. W. A. Adam

known British engineering firms and having reached a senior managerial position in engineering, he resigned to develop his marketing experience and in 1951 joined the Scottish Engineering group of G. and J. Weir as managing director.

Mr. Adam is a member of the Institute of Mechanical Engineers, the Institute of Marine Engineers and an associate fellow of the Royal Aeronautical Society.

☆

George Kent Limited have appointed **Mr. R. C. Ingram** to the newly created post of marketing manager.

Mr. Ingram joined the company as a student apprentice in 1934 and became a service engineer on completion of his training. Later, he became manager of the first

Mr. R. C. Ingram

nuclear section of production control, which was responsible for the supply, erection and commissioning of the instrumentation for Harwell's first large-scale reactor, and later for equipping both reactors at Windscale.

During the last ten years Mr. Ingram has been a technical sales representative for Yorkshire and Middlesex.

G.E.C. (Domestic Equipment) Ltd. announces that **Mr. W. S. Whitehead** has been appointed overseas marketing manager.

Mr. Whitehead was export manager for Morphy Richards for many years and has travelled extensively in most of the world markets.

He is to build up and strengthen the export organisation of G.E.C. both to maintain and increase business in the company's existing overseas markets and to extend it to Europe and elsewhere.

☆

Morane Plastic Company announce the appointment of **Mr. R. J. C. Brook** as sales manager.

Mr. Brook's appointment comes at a time when Morane are considerably extending their activities

Mr. R. J. C. Brook

in the printing world with specialised laminating machinery and processes.

Mr. Brook, who was until recently, Midland sales manager with A. B. Dick and Company, brings to his new appointment long and specialised knowledge of the printing trades, with which he was been connected for more than ten years.

☆

Mr. R. J. L. Wood has recently been appointed by British Geon to act as representative for Hycar nitrile rubber and latex in the Southern sales area.

Mr. Wood's appointment is an addition to the existing Hycar sales force.

☆

Mr. A. Cole has joined the Mining department of G.E.C. (Engineering) at the company's Fraser and Chalmers works at Erith, Kent.

Mr. Cole will maintain contact with mining companies and will supervise, if necessary, the commissioning of G.E.C. mining plants in this country.

Mr. Cole has worked in Germany and for the West African Gold Corporation. He returned to the U.K. towards the end of the

Mr. A. Cole

war to take up a position with Metropolitan-Vickers. From 1950 to 1961 he was employed by the Colonial Development Corporation as a metallurgical engineer and chemist at the Macalder Nyanza Mines, Kenya. Mr. Cole was, at this time, in charge of the mine Research and Assaying Laboratory.

☆

The National Coal Board have appointed **Mr. H. R. Hodgson** to be marketing director of their South Western division.

Mr. Hodgson who is manager of the general branch of the marketing department at the Board's headquarters succeeds **Mr. D. F. Pexton** whose retirement, due to ill-health, was announced in October.

Mr. Hodgson entered the service of the National Coal Board in October 1946 as departmental secretary of the board's marketing department at headquarters and in 1954 was appointed manager of the general branch in that department.

☆

Mr. H. D. Byles has been appointed managing director of Packman Machinery Ltd., of Twyford, one of the Baker Perkins group.

Mr. Byles, who was appointed to the board earlier this year, will cease to act in his former capacity as a representative of Baker Perkins and will concentrate entirely on Packman Machinery affairs.

This appointment will allow Mr. P. J. Packman, who becomes chief engineer and technical director, to devote his full time to the design and development side of the business.

☆

Brook Motors announce that **Mr. M. J. L. Brook** has been co-opted on to the board as Production Director.

After completing a five-year course of technical training in the engineering industry, Mr. Brook was head of the technical service department. This was followed by his appointment as assistant to the Works Manager.

Mr. Brook is the grandson of the late **Ernest Brook,** founder of the firm and the son of the present managing director.

☆

Mr. B. D. Hughes has recently joined Crompton Parkinson (Stud Welding) Ltd. as special projects engineer.

Before joining the company, Mr. Hughes was with W. S. Atkins and Partners, civil engineering consultants, as a design engineer. He is an associate of the Royal Technical College, Salford, and an

Mr. B. D. Hughes

associate member of both the Institute of Structural Engineers and the Institute of Welding.

Mr. Hughes is to be available for consultation with structural engineers, consultants and highway authorities on the application of the Cromp-Arc stud-welded shear connector to the composite construction of bridges and buildings.

DO WOMEN *WANT* TO BE ENGINEERS?

'Industries in this country have not sufficient to offer'

MR. HUTCHINGS has answered his own question on "Do Women Make Good Engineers?" in his interesting review (December 7 issue) of the report by Miss Souter and Miss Winslade on their investigation into women engineers in the USSR. Of course, if they want to, women make good engineers. But does engineering really offer the good life for women?

Many years ago, fresh from university, I applied for a position as stress engineer with a famous aircraft company. I was interviewed by the chief stressman and he liked me (so he told me later), but the chief designer vetoed the proposition on the grounds that I might inhibit his flow of language!

At the time I was exasperated at what I regarded as a prime piece of crassness, but now I feel that perhaps he had something. Women are indeed less amenable than men to discipline and they do have a stronger urge towards gracious living.

Following an article Do Women make good Engineers? (December 7 issue) by D. W. HUTCHINGS of Oxford University, Engineering News presents a woman's view by Mrs. Molly Neal, BSc, DIC, AFRAeS.

Changing times

Nevertheless, times are changing: last month I lunched with that same chief designer, now knighted and a director of his company, and I learned that today he accepts as commonplace the presence of women on his technical staff and in his drawing office.

So it would seem that even in this country women are slowly filtering into engineering in larger numbers.

The position at present is that any girl with built-in engineering inclinations and ability can enter the profession and can rise to senior and even managerial rank. (One of the authors of the report reviewed by Mr. Hutchings is manager of the systems group of an important instrument company.)

There may be difficulties with physics and maths if the girl is unfortunate in her parents' choice of school—because there aren't so many girls' schools that do provide a good basis in these subjects—but such difficulties will be overcome if a girl is determined that engineering is for her.

But of course the majority of intelligent girls do not have such one-track minds! They've probably never given engineering a thought. Should they be persuaded to do so during their last few years at school?

I'm not convinced; I don't think the engineering industries in this country offer a background in which the intelligent young woman will realise her full potentialities—not unless she is intrinsically interested in engineering.

Ironmongery and sums aren't sufficient to satisfy the majority of women. In Russia, there is another factor at work that unfortunately just doesn't seem to operate in the Western world: a real feeling of pride in working together to raise the standard of living.

When I was just about to embark on an engineering course at the university, a social science student said to me: "But you'll be dealing with things, not people." Myself, I prefer things: most women quite rightly don't.

Coming EVENTS

December 30-January 6
International Racing Car Show, Old and New Horticultural Halls, Westminster, London.

January 3-13, 1962
Eighth National Boat Show. Earls Court, London.

January 8-12, 1962
International Heat Transfer Conference, Institution of Mechanical Engineers. Westminster London.

January 9-11
Eighth National Symposium on Reliability and Quality Control. Washington, D.C.

January 15-19
Symposium of Optical Character Recognition. Washington, D.C.

January 15-19
Exhibition of Scientific Instruments and Apparatus, Old and New Horticultural Halls, Westminster, London.

January 22-25
National Plant Maintenance and Engineering show. Convention Hall, Philadelphia.

January 24-27
Canada Farm and Industrial Equipment Trade Show. Toronto, Canada.

January 27-February 2
Electrical Engineering Exposition. New York.

February 5-9
Symposium on Electroforming-Applications, Uses, and Properties of Electroformed Metals, ASTM, Dallas, Texas.

February 7
Symposium on Two-Phase Fluid Flow. The Institution of Mechanical Engineers, 1 Birdcage Walk, Westminster, London.

February 16-24
International Inventions and Commercial Development Exhibition. Central Hall, Westminster, London.

February 26-28
Joint I.E.E./R.Ae.S. Conference. The importance of electricity in the control of aircraft. London.

March 9-18
Eleventh International Inventors' Exhibition. Brussels.

March 13-15
Conference on Testing for Performance. The Plastics Institute, London.

March 15
Symposium on the Computer and Mechanical Engineer. Institute of Mechanical Engineers, London.

March 20-24
Eleventh Electrical Engineers Exhibition. Earls Court, London.

March 28-29
Third Symposium on Engineering Aspects of Magnetohydrodynamics. University of Rochester, New York

April 9-13
International Pipes, Pipelines, Pumps & Valves Exhibition and Conference, Earls Court, London.

April 11
Symposium on Modern Rolling Mill Practice. Sheffield University.

April 13-19
International Refrigeration Fair, Olympia, London.

April 30-May 4
International Compressed Air and Hydraulics Exhibition and Conference, Olympia, London.

April 30-May 5
Production Exhibition, Olympia, London.

April 10-14
Second International Conference on Stress Analysis. Paris.

April 16-18
Second International Flight test instrumentation Symposium. College of Aeronautics, Cranfield, Bucks.

April 21-October 21
World Fair. Seattle, U.S.A.

May 1-4
Contractors Plant Exhibition, Swinton, Manchester.

May 19-29
Europlastique 62, Exhibition of Rubber and Plastics, Paris.

Gearbox has equal step speed range

POSITIVE equal step settings which can be exactly repeated are among the features of a multi-speed gearbox introduced by Matterson Ltd., of Rochdale, Lancs.

Known as the "Arithmic" gearbox, all speeds are in arithmetical progression and can be arranged for 21 speeds with a 2:1 range, or 24 speeds with a 24:1 range. Selection of ratios is by lever control.

Used in conjunction with an additional change gear-box, the range of useful speeds can be multiplied, to give 84 speeds in an 8:1 range as one example.

Two sizes are at present being produced, rated at 10 and 30 h.p. at a nominal input speed of 1,000 rev./min.

Standard reversing gear-boxes are also available with shaft heights to match Arithmic boxes. Reduction ratios from 1:1 and 3:1 and also electrical interlocks in the change lever can be included.

VICKERS IMPROVE QUICK-FREEZE

New plant range for accelerated drying

WITH the growing interest in the accelerated freeze-drying process, Vickers-Armstrongs at South Marston are producing a range of freeze-drying plant to suit the varying needs of the food industry.

To fulfil these variations Vickers can provide pilot equipment for research processes, medium sized plant for versatile operation, or large scale installations for economic single product processing.

The process-research pilot plant is basically designed for product evaluation and small scale production.

It is fully instrumented and will take 35lb. of "wet" food. Contact heating is employed, but the heater plates can be adjusted for optional radiant heat use by maintaining them in the fully open position.

Mechanical refrigeration is incorporated, with a dry-ice condenser system as optional.

The design of the batch processing plant has aimed at amortizing the capital cost over the throughput for a reasonable period.

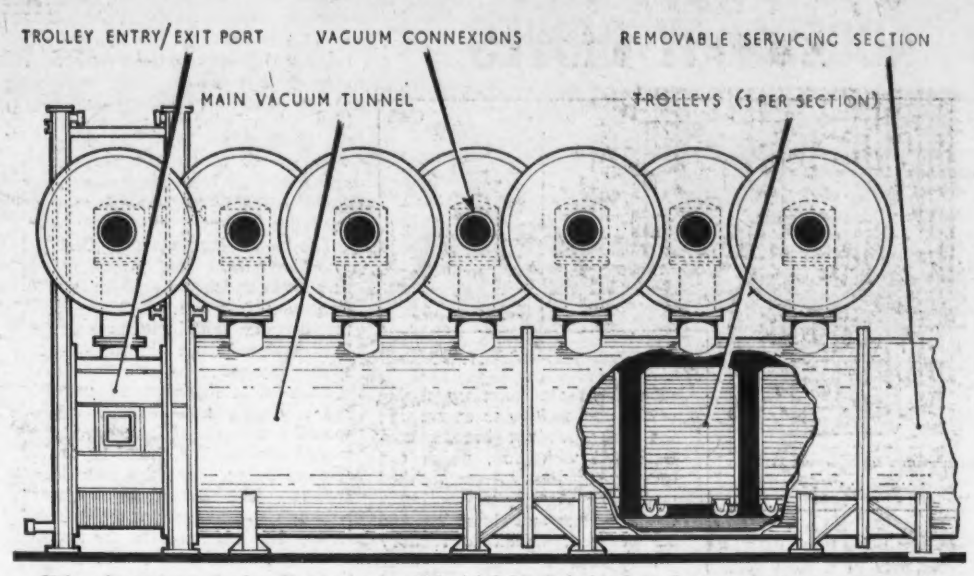
Therefore, efforts have been made to provide a basic cabinet capable of multiple installation with a common evacuating, heating, and condensing system.

Maximum power

To avoid partial thawing of the food, evacuation can be completed in about five minutes by large capacity steam operated ejector pumps, or mechanically operated rotary types.

Water vapour is removable either by a multi-stage steam ejector system, or a refrigerated condenser method. The choice depends on availability of steam and water, ambient temperature, and power supply costs.

Contact or radiant heating can be used, the former being cheaper to operate due to the shorter drying times, but the lower capital cost of the radiant heat system may outweigh this advantage.



Side elevation of the first two sections of Vickers' pilot, freeze-drying equipment.

The plant comprises a tubular tunnel about 100ft. long with ice condensers mounted in groups to suit the vapour load encountered at specific points. An automatic defrosting rota is operated in each group.

Heat for sublimation is provided by banks of cantilevered radiant heater mats between which the food is automatically passed on trolleys.

Heater plate temperature is aligned to the vapour duty requirements at any single stage in the drying cycle, for a given product.

Each heater bank will automatically trip-out if predetermined temperatures are exceeded. No thermocouples are inserted into the food. But the whole processing cycle is automatic.

Particular care has been paid to making all equipment accessible for servicing.

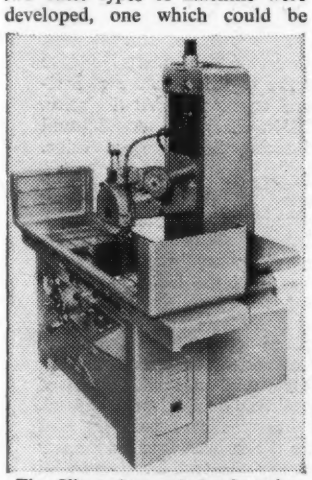
Design improvements increase the efficiency of grinding machines

Today's demand is for speed and accuracy

—by—
C. W. KENWARD
Our Machine Tools Correspondent

PRIMARY use for surface grinding machines when they were first introduced to industry was for finishing hardened metal which could not be machined by any other means.

From this initial requirement two basic types of machine were developed, one which could be used to obtain high precision and finish, the other for "plough grinding", to achieve maximum metal removal rates — accuracy and finish being only a secondary consideration.

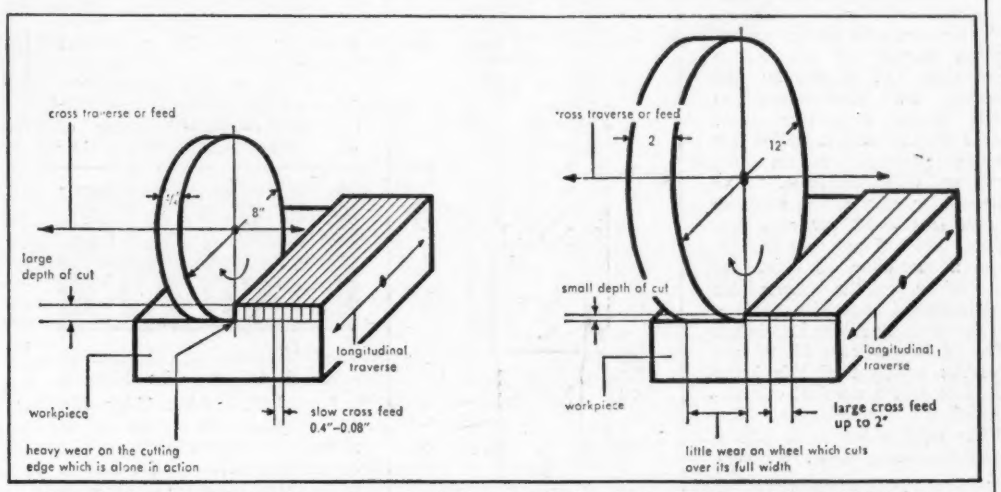


The Elb surface grinder has the worktable and grinding wheel carriage mounted on separate slideways on the machine bed for maximum rigidity.

Present-day demand is for grinding machines combining high accuracy with rapid metal removal rates.

This has necessitated constant design improvements with particular emphasis on wheelhead and slideway construction, coupled with an all-round increase in machine rigidity.

The design of the Elb surface grinding machines, made by Elbschliff Edmund Land, W. Germany and sold in the U.K. by SOAG Machine Tools, Juxon Street, London, S.E.11, is an appropriate example of how one manufacturer has overcome the problem of combining accuracy and surface finish with the demand for heavy and rapid stock removal.



The wheel on the left is taking a large depth of cut with slow feed. The larger wheel (right) cuts a small depth with fast cross feed, giving less wheel wear and freer cutting.

This design completely separates the cross movement from the longitudinal movement by dispensing with a compound-type table, eliminating possibility of sag, canting, or other compound errors.

The worktable is fully supported along its entire length and slides along the main casting forming the bed of the machine. The cross-moving column which carries the wheelhead is fully supported in the same manner.

In this way, advantage is taken of the strength and rigidity of the base casting to ensure maximum support to wheel and workpiece.

Spindle design also plays a major part in improving efficiency, as the spindle must withstand heavy duty and still produce accurate and highly finished work.

The spindle of the Elb machine is of large diameter and has a bearing play of only 0.00004in. It has a plain bearing lubricated with pure paraffin supplied to the spindle through a special lubricating chamber system.

Evacuation pumps

The spindle is directly driven by a Brown Boveri 2-speed motor without any intermediate belts, clutches or couplings. This arrangement ensures a maximum power and eliminates transmission marks on the work.

A grinding wheel is a multiple cutting tool composed of thousands of chip-removing grains. Grinding efficiency, therefore, increases with the number of grains which can be brought into action.

If a grinding wheel is used to cut with its edge only with a large depth of cut and slow feed, the heavy loading on the edge causes rapid wear.

This often leads to a clogged wheel and, due to the small number of abrasive grains cutting, stock removal is poor with heavy loss of power, and the finish unsatisfactory.

The Elb machines are designed for the full-face, wide wheel grinding method using a fast cross-traverse which gives a rapid rate of stock removal compared to the wheel-edge method.

Using relatively large diameter wheels and low depths of cut, heating and distortion of the work is avoided.

Modernising Brighton

MODERNISATION of Brighton's public water supply was taken a stage further on Friday. Earl Jellicoe opened an automatic pumping station at Mile Oak.

The control unit, produced by Parkinson Cowan Measurement, is five miles from the Waterworks Department, linked through two rented GPO lines.

A programmer can store operating requirements for six surface and well pumps over seven days.

Pump working is automatically checked every half-hour and at the same time, any combination change is signalled to the station. Interlocks and timed delays ensure a balanced flow at all stages.

Visible and audible alarms signal all faults. A strip chart recorder provides a four month record of operating conditions.

It is possible to interrupt the scheduled procedure at any time by manual signalling. This can also be done in the pumping station.

UNIT TESTS METERS WHILE THEY WORK

UNI-DIRECTIONAL and bi-directional meter provers which allow flow meters to be calibrated while at work are to be manufactured by the Commercial Products Group of de Havilland Aircraft.

The group will sell throughout the world, with the exception of the North American continent, under the terms of an agreement concluded with the F. H. Malony Co., of Houston, Texas.

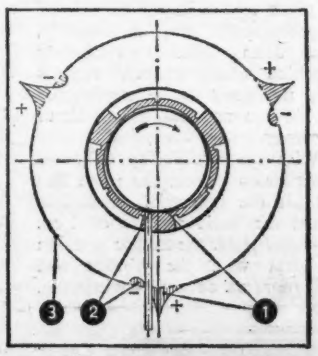
Meter provers are of particular use when liquids of varying viscosity are being measured.

The equipment consists of a permanently installed loop of prepared pipeline.

A flexible sphere, which fits the pipe bore, can be inserted and withdrawn through special ports.

Flow rate is calculated from the time the sphere takes to traverse a known distance along the prepared section. The time taken is electronically measured.

The advantages claimed for this system are extreme accuracy, insensitivity to variations in viscosity, and no interruption of oil flow while flowmeters are checked.



1, Build-up of pressure, where section allowing least play begins, in the direction of spindle rotation. 2, Vacuum, producing suction effect, at end of section allowing least play, in the direction of spindle rotation. 3, Pressure zero line.

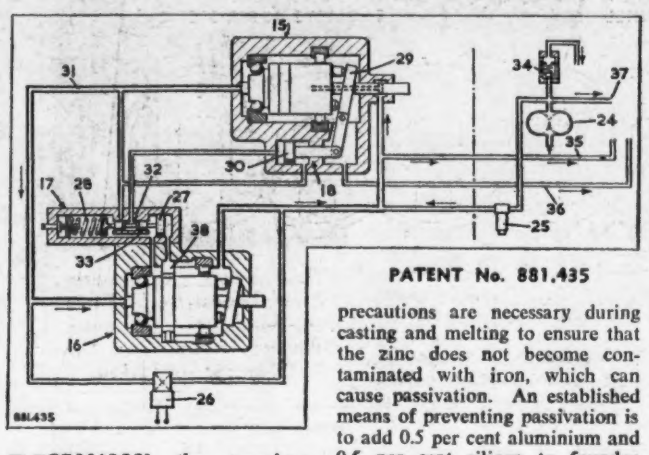
Die-hards and Die-castings

It is a fact that in many industries thousands of components are being produced by out-of-date expensive methods.
Don't be a die-hard! The die-casting process can produce any quantity of units, of any complexity to a high degree of dimensional precision slashing the costs of machining, fitting and assembly.
Castings can be treated with a variety of finishes.
We can also assist by producing components ready assembled if required.

STREBOR DIE CASTINGS
FULL DESIGN AND TOOL-MAKING FACILITIES AVAILABLE

STREBOR DIE-CASTING CO. LTD., WINDLEY WORKS, RADCLIFFE, LANCS.
Phone: RADcliffe 2661 (3 lines). Telex No. 66.305 ST 16

CONSTANT SPEED MOTOR ACCESSORY DRIVES



PATENT No. 881,435

NORMALLY the engine accessories of a road vehicle are directly driven from the engine, so that their speed varies over a wide range between idling and maximum rev./min. To overcome this disadvantage, **Integral Ltd.,** propose, in **Patent No. 881,435,** to provide a constant speed hydraulic drive for the electrical generator, cooling fan and water pump, and also for a compressor for supplying the vehicle ventilation system.

The hydraulic system for the accessory drive comprises an engine-driven variable-delivery swashplate pump 15 which supplies a hydraulic motor 16. The pump delivery is adjusted by a governor valve 17 and servomechanism 18 so as to maintain the motor speed constant. The electrical generator is directly driven from the output shaft of the motor; fan, water-pump and compressor being driven through a belt drive.

Magnetically controlled clutches are proposed for disconnecting the drive to compressor and fan. An engine driven pump 24, supplying the vehicle lubrication system, also supplies make-up oil to the pump 15 through a filter.

A bypass line is automatically opened by an electrically operated valve 26, to unload the hydraulic motor, when the self-starter is operated: the valve closes automatically after a preset delay when the starter button is released.

The speed control arrangements are as follows: the governor valve 17 has a piston 27 subjected to the hydraulic pressure difference generated by a centrifugal impeller 38 driven by the hydraulic motor 16, and balanced against this pressure difference by a spring 28. The servomechanism 18 for controlling the swashplate 29 of the pump has a piston of differential area, exposed at the right-hand end to pressure in the pump delivery line 31 and at the left-hand end to pressure in the chamber 32 of the governor valve.

So long as the motor speed is at the desired value, valve 17 occupies the neutral position as illustrated. If the motor speed increases, the increased pressure acting on the right-hand end of piston 27 causes the governor valve to admit pressure to the left-hand side of servopiston 30, thereby causing the swashplate angle to decrease. Similarly, if the motor speed decreases, movement of the governor valve causes an increase in the swashplate angle.

SELF-CLEANING ANODES ASSIST PROTECTION

IN the production of zinc anodes for sacrificial cathodic protection of ferrous materials, special precautions are necessary during casting and melting to ensure that the zinc does not become contaminated with iron, which can cause passivation. An established means of preventing passivation is to add 0.5 per cent aluminium and 0.5 per cent silicon to foundry quality zinc.

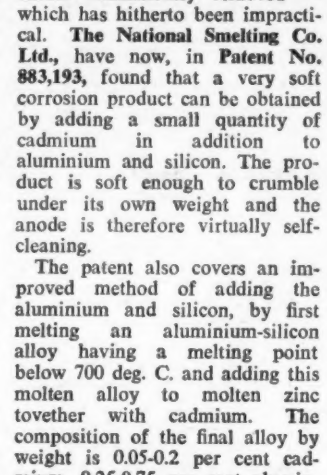
The aluminium, which is used as a carrier for the silicon, produces, when in use as an anode, a corrosion product that can shorten the life of the anode unless continuously removed — which has hitherto been impractical. **The National Smelting Co. Ltd.,** have now, in **Patent No. 883,193,** found that a very soft corrosion product can be obtained by adding a small quantity of cadmium in addition to aluminium and silicon. The product is soft enough to crumble under its own weight and the anode is therefore virtually self-cleaning.

The patent also covers an improved method of adding the aluminium and silicon, by first melting an aluminium-silicon alloy having a melting point below 700 deg. C. and adding this molten alloy to molten zinc tovether with cadmium. The composition of the final alloy by weight is 0.05-0.2 per cent cadmium, 0.25-0.75 per cent aluminium, a maximum of 0.185 per cent silicon and the balance zinc and incidental impurities.

A satisfactory silicon aluminium alloy is 20 per cent Si; 80 per cent Al; sufficient of this being added to give a nominal Al conten of 0.5 per cent, and also adding solid cadmium to give a nominal content of 0.1 per cent Cd.

TRANSFORMER WINDINGS TO CUT COSTS

THE use of solid insulation between an inner transformer winding and an outer winding immersed in oil permits savings in copper and a reduction of losses. However, it demands an axial duct in the outer winding to facilitate oil circulation. Hitherto this has involved complicated winding arrangements, but **Ferranti, Ltd.,** have overcome this disadvantage in **Patent No. 882,867.**



PATENT No. 882,867

This is achieved by a combination of helical winding (i.e., a winding in the form of a cylindrical helix) and a spiral winding (i.e., a flat spiral).

A half sectional elevation of a high voltage winding is shown in the illustration. Thus, the outer winding of the transformer, is separated from the inner low voltage winding by a tube of solid insulation 3.

The high voltage winding illustrated comprises ten groups of turns, of which only three are shown — Groups 1, 2 and 10 together with initial section 4 and final section 5 both of which are spirally wound.

Each of the groups of turns has a double layer of helically wound section 6 and form spirally wound sections, 7, 8, 9 and 10, the sections being spaced by suitable spacers. The last turn of the spirally wound section 10 in Group 1 is connected to the first turn of the helically wound section in Group 2, and so on. The winding is simple to wind and provides an actual duct for circulation of cooling oil.

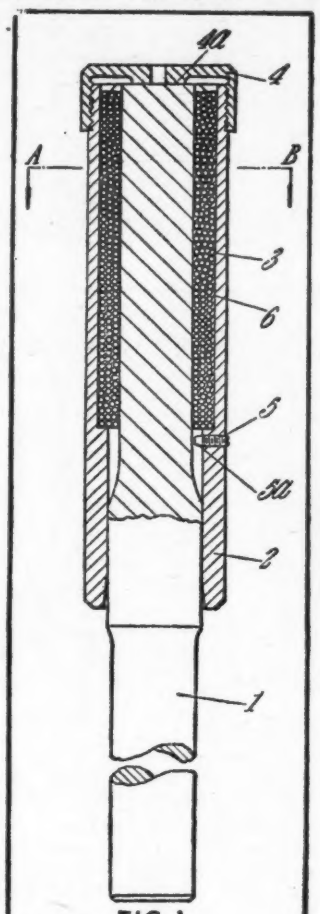


FIG 1

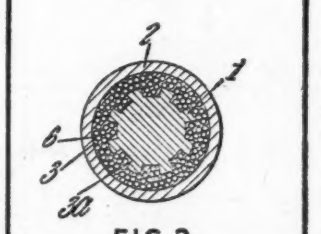


FIG 2

PATENT No. 883,458

MOULDING PROCESS FOR WEAR RESISTANCE

TO impart improved resistance to surface wear of a plastics article, reinforcement by means of hardened steel balls is proposed by **the Ford Motor Co. Ltd.,** in **Patent No. 883,458.**

A particular example used to illustrate the principle in the Patent is a gauge for testing splined shafts. A hardened and ground steel master spline mandrel 1 is provided with a thin coat of parting agent. Over the mandrel is drawn a sleeve 2 serving as a mantle.

The space between the master mandrel 1 and sleeve 2 is filled alternately with a liquid thermo-setting plastics material 6 and hardened steel balls 3. The plastics is then cured. The sleeve is closed by a threaded cover 4, which has a raised boss 4a to serve as a locating stop in the finished gauge.

A radial set-screw 5 in the sleeve has a shoulder 5a which is used in the finished gauge to test the accurate insertion of work-pieces so as to avoid damaging the edges 3a of the profile.

After curing is complete, the master mandrel is withdrawn and the gauge is ready for use. If due to wear the profile ceases to be accurate, the sleeve 2 may be bored and refilled.

new PATENTS

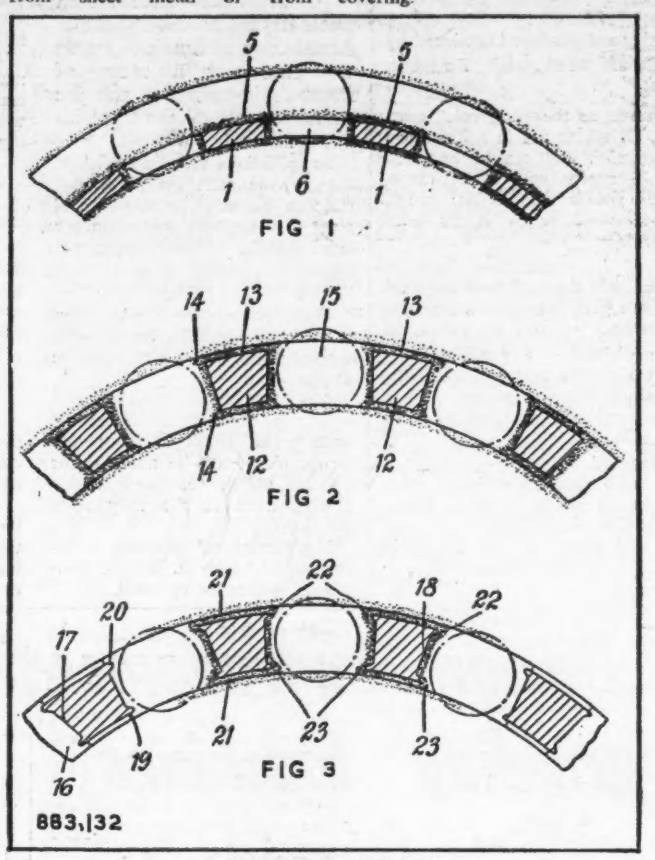
PLASTICS FACED CAGES FOR BEARING NEEDLES

CAGES for small bearing needles of relatively great length can be economically produced by punching the windows in drawn metal — but the rough surface finish has detrimental effects on the operation of the bearing. **Patent No. 883,132,** granted to **Wilhelm Schaeffler** and **Georg Schaffler** of **Industrie werk Schaeffler,** Germany, aims to avoid the poor sliding properties associated with metal cages by providing a plastics surface on a metal base cage.

This offers the good low-friction properties of plastics without their disadvantages of poor dimensional stability, low strength and poor heat conductivity that are associated with all-plastics construction.

The patent outlines several alternative basic constructions from sheet metal or from punched-out tube material, in each case the metal cage body being left with rough surfaces or artificially roughened by sand blasting before applying the plastics coating to cover all the surfaces.

The needles are retained in the windows of the cage solely by means of the plastics covering, as may be seen from the illustrations, in which the stippled shading represents the plastics covering.



PATENT No. 883,132

BOOK REVIEWS

The Meaning of Engineering. W. T. O'Dea. The Museum Press, Ltd., London. 184pp. 21s.

The engineer of today is of necessity a specialist to such a degree that it is easy for him to lose sight of the place of his work in the overall scheme of things.

Engineering has become so completely interwoven into the pattern of modern life that it is increasingly difficult to see in perspective exactly what is the function of the engineer in relation to the work of other members of the community.

Mr. O'Dea's book sets out to illustrate the part that the craft of engineering has played in shaping the modern world, and what could be done by engineers, given the opportunity, to improve the lot of mankind in the future. This objective is attained successfully, and a fascinating story is told in the process.

The author traces the development of engineering from the days of Thomas Newcomen, and early on in the book prominence is given to the important role of improvements in iron-founding, and John Wilkinson's boring machine which enabled engines and machines to be constructed to hitherto unobtainable limits of accuracy.

With the availability of economic steam power, the stage was set for the industrial revolution. From the basic matters of iron, coal and steel, the author goes on to deal with the history and achievements of civil engineering, as being, in fact, "the branch of engineering with the oldest roots".

A further chapter relates the development of mass production, and there are some highly pertinent comments on the social and economic aspects of this much maligned and misunderstood field of industry.

Subsequent chapters deal with electrical engineering, transport, agriculture, and the relevance of engineering to home life and leisure.

Mr. O'Dea devotes his last chapter to what engineering may yet achieve. The author states that this is frankly a personal view, but from his position as an engineering historian and recorder of technical advances (he is a Keeper in the Science Museum, London) Mr. O'Dea is surely in a suitable situation to comment fairly on this matter.

This last chapter is certainly of particular interest, and there is much to ponder over. It is to be hoped that the engineer may be given the chance to deploy his special skills for the benefit of all, and that due consideration is given by as many people as possible to what can only be called the philosophical aspects of industry.

Dictionary of Agricultural Engineering. H. J. Hine. W. Heffer and Sons, Ltd., Cambridge. 252 pp. 15s.

This book is really much more than simply a dictionary, because each of the terms defined is followed by a short article giving relevant information.

In many cases historical notes are given, and the book is really a mine of information. The French and German equivalents are given for each of the terms.

The preface states that the purpose of the dictionary is to help engineers and farmers to apply the benefits available from research and development in subjects for which day-to-day access is needed to formulae and reference tables and to statements of the principles involved.

At the same time, the needs of students in both engineering and agriculture have been kept in mind. A brief note on the evolution of machinery referred to is given, and where possible the derivation of the English name of the machine or implement is suggested.

Subjects such as the physics of the atmosphere and of the soil are included, because many agricultural processes involve the providing of an artificial climate or the unnatural breaking of soil.

A list of relevant abbreviations is given, which will facilitate reference to the literature of agricultural engineering. At the price, the Dictionary of Agricultural Engineering is very good value.

Dictionary of Mechanical Engineering. A del Vecchio. Peter Owen, Ltd., London. 346 pp. 42s.

This dictionary was originally published in the U.S.A. It is intended for practising engineers, and for students and teachers engaged in engineering mechanics and associated subjects.

Terms used in a wide range of related fields are clearly defined, and diagrams have been included where it has been found necessary to clarify the text. Further useful information is given in the appendix. It should be borne in mind, however, that certain of the terms defined are only common in American usage.

Daten und Tabellen-Sammlung fur Radiopraktiker. (Data and Tables for Radio Amateurs.) H. G. Mende. Francis Verlag, Munich. 93 pp.

This is the hundredth booklet in this series of practical books on radio and television. Information is of international interest, as it includes metric and English units, characteristics of the latest materials, abbreviations, diagrams, calculations, formulae, etc.

In this connection, it may be interesting to add a few words about this series, published by Francis Verlag in Munich. The first volume appeared in 1950, and since then two and a half million copies have been sold, some of them translated and published in Denmark, Finland, Holland and Italy.

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BRITISH INDUSTRY PREPARES FOR THE COMMON MARKET

Belfast believes that cutting costs is the answer to the EEC

J. D. F. Perry, Engineering News Industrial Editor, continues his round-Britain series on the Common Market.

AN Ulster engineer in the snow outside his factory in the Castlereagh suburb of Belfast asked me: "Have you realised, that Northern Ireland has the same geographical relationship to Great Britain that Britain has to the Common Market countries. Each is cut off by a strip of water from the larger mainland, each is off the north west coast."

Exact comparison breaks down at this point, but the implications of the remark are serious and not easily put aside.

Despite her slowly rising national output and recurring financial crises, Britain has high living standards and low unemployment levels.

On the Continent, with its growth rate far ahead of that in the U.K., living standards are only now beginning to come up to the British level and, in the case of the prosperous West German economy, to begin going out in front.

High unemployment

Northern Ireland suffers the paradox of having welcomed many new firms to the Six Counties, of having achieved a higher rate of advance in industrial output, yet of still having a rate of unemployment which is a multiple of the average United Kingdom figure, and of having the added burden that among its workers, instead of an atmosphere of confidence, there still lurks the fear that "this job may not last, and where will the next one come from ?".

Belfast may have a more cautious manner of looking at the future than the ebullient, booming south-east area, but I found plenty of evidence of new ideas and solid success in the older field.

Across the bridge over the river and past the mail boats running to the mainland, I went to see Short Brothers and Harland, who are busy on a Ministry contract for ten Belfast air freighters for Transport Command.

Air freighters

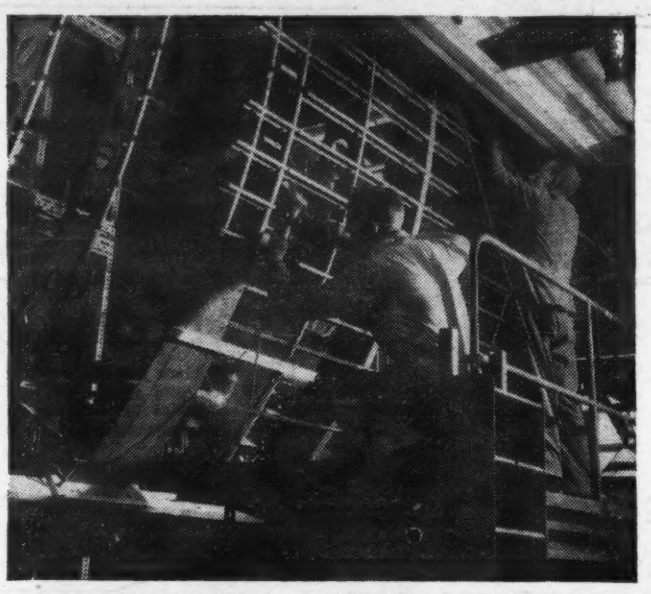
To a very special degree the future decisions of the world's airlines on the carriage of air freight (whether in the specially designed high-lift-capacity Belfast or in converted passenger planes) is a matter of concern to Ulster.

At almost £2 million for each plane, the Belfast freighter is not sold readily or in large numbers. In this project Short Brothers and Harland have the rising volume of world trade in manufactured goods on their side.

Particularly relevant is the way in which customers around the world expect spare parts to be transported to them at next to no notice.

This, coupled with the improving living standards of many countries, leading to increased movement of high-value goods, from horticultural products to precision grinding machines, suggests that the boom in air freight business, which has been about-to-arrive for years, may at last materialise, bringing with it orders that would put the company in an envied position in the British aviation industry of the mid-1960s.

Meantime, there is one cloud in the sky of airline economics. The big operators now have the capital commitment of having bought the very big pure jets, and with them more seats than they can fill.



A centre fuselage section for the SC5 Belfast freighter under construction at Short Brothers & Harland's Queen's Island works.

This does not create an overflowing purse from which to buy high-cost specialist aircraft, nor does the lack of passengers put any pressure on the amount of freight that can be carried.

Against this is the reasonable argument that the Belfast, being designed for freight carrying and not merely tucking in parcels as an afterthought (it is able to accommodate large Army lorries), could, imaginatively promoted, be able to create its own business—putting the speed and frequency of its service against the high capital cost.

As the workshop of the Western world, the European Common Market will be doing a growing volume of exporting over the years.

It would bring a great deal of work and reward to the Ulster aircraft industry if the appropriate parts of this trade went by Belfast freighter.

At the other end of the financial scale, Short Brothers have the Skyvan, a twin-engined small private venture. A small but high-powered technical sales team travels the world, marketing this aircraft, which, with convenience of operation, working flexibility, and cheapness in running, should have a hard-working future.

More will be known of this aircraft's potential market when it can be flown in demonstration. For purely internal European freight services it may be the answer to those transport problems where time is more significant than the freight charges.

Short Brothers and Harland, and the shipbuilding and engineering firm that is almost synonymous with Ulster industry, Harland and Woolf, play essential roles as big manufacturers and substantial emconcerned in raising the number of Ulstermen employed in manufacturing industry and in broadening, and so securing, the base of the region's economy.

One such company I visited, with a small engineering section, was Munster Simms, the major part of whose affairs are concerned with the distribution of petroleum products.

Ten years ago the exports of the engineering side of the company were about 3 per cent. Now they have been lifted to 30 per cent.

Keen competition

On small naval craft and fishing vessels all around the world the Whale hand pumps of Munster Simms are now fitted. Competition is keen, and the company keeps its position only by constantly redesigning the product.

A natural development from the bilge and galley pumps for small craft has been the supply of pumps to caravan makers. The numbers of caravans in Europe climbed rapidly in the last three or four years and a Munster Simms executive explained that this increase was levelling off.

With the life of a caravan somewhere about four years there should be a good replacement business here.

I spoke to Mr. E. D. MaGuire, Chairman and Managing Director of Davidson and Co., Limited, Sirocco Engineering Works, a Belfast firm that has been in existence for 80 years and has an extensive overseas sales and service organisation. Its products cover a wide range and include fans for power station, mining, marine, nuclear engineering and general industrial applications, air preheaters, air conditioning and dust collecting plant, pneumatic conveyance, and complete equipment for tea estate factories.

Mr. MaGuire told me:

You can take it that the able man in a skilled or supervisory occupation is most likely to be already in a good job. It follows that if a new firm does not bring its own key people with it, they must be recruited from existing firms.

"In terms of the overall economy it is doubtful if this is a good thing — the problem is an involved one — but it certainly is a problem for the older established firms who have spent time and money in the selection, training and guidance of promising youngsters over the years, to lose them when they are really only starting to earn their keep, you might say."

The big Sirroco works of the Davidson company, on two large sites in an old and cramped part of Belfast, must suffer with similarly placed companies from losses due to important workers being attracted to firms starting up out in more rural areas, with the more open living conditions, perhaps in a new house nearby.

At Castlereagh, Mr. David Wood, chairman of the Belfast Tool and Gauge Company, repeated what others have said before, that the high interest rates and low availability of money are preventing many small firms, even where they have the offer of valuable manufacturing contracts, from developing and expanding their output.

The direct effect of this is to prevent such firms from investing in new productive capacity, an indirect effect of which is to restrict demand for capital equipment, denying to the manufacturers the chance to improve their export competitiveness by reducing production costs on the basis of assured long periods in full volume working.

The Belfast Tool and Gauge Company has carried out work producing special gauges for an Italian producer of rock drills and is working for a Houston, Texas, firm.

When I saw Mr. Wood he was preparing for a business trip in Western Europe with the certainty that the more anticipation of Common Market co-operation that can be put into effect the better will be the chance of profiting from the opportunities.

At the Castlereagh works of John Hind & Sons, who have a long history of producing piston rings for large engines and compressors, Mr. Richard Hind a director, told me of the development of machines for making boxes from plastics.

Boxmaking from acetate plastics is so widely carried on in Northern Island that the box makers are able to import their materials at special rates, giving them a powerful advantage against the opposition.

Radical changes

The firm's plastic creasers, or boxmaking machines, have sold well in Ulster and with their further development, and the swift growth in packaging a steady build up of exports is a possibility.

The Chairman of Davidson's also emphasised that the entry of Britain into the Common Market could be expected to produce radical changes in British industry, even among the firms that were efficient and prospering.

Mr. MaGuire went on to say: "In the Common Market there will probably have to be development in collaboration with firms of like interest in the other countries of the Community. This will in all likelihood take the form of our supplying the more highly specialised parts of the plant, leaving our opposite numbers to do the static or bulky parts.

Accordingly, a greater emphasis is going to be placed on the skill and specialised knowledge put into the product as factors in its saleability, or rather, "exportability" to other Common Market countries. In other words, it will be the "entrepreneur" and labour content, rather than the material, that we shall have to concentrate on exporting, and in our own case this will probably mean a selective process to obviate the transport of the bulky part of the equipment. It is the higher priced part, representing management and skilled labour charges, that we shall be selling."

The "Sirocco" Chairman saw the Common Market as offering better opportunities for forward production planning, because of its greater size and consumption potential.

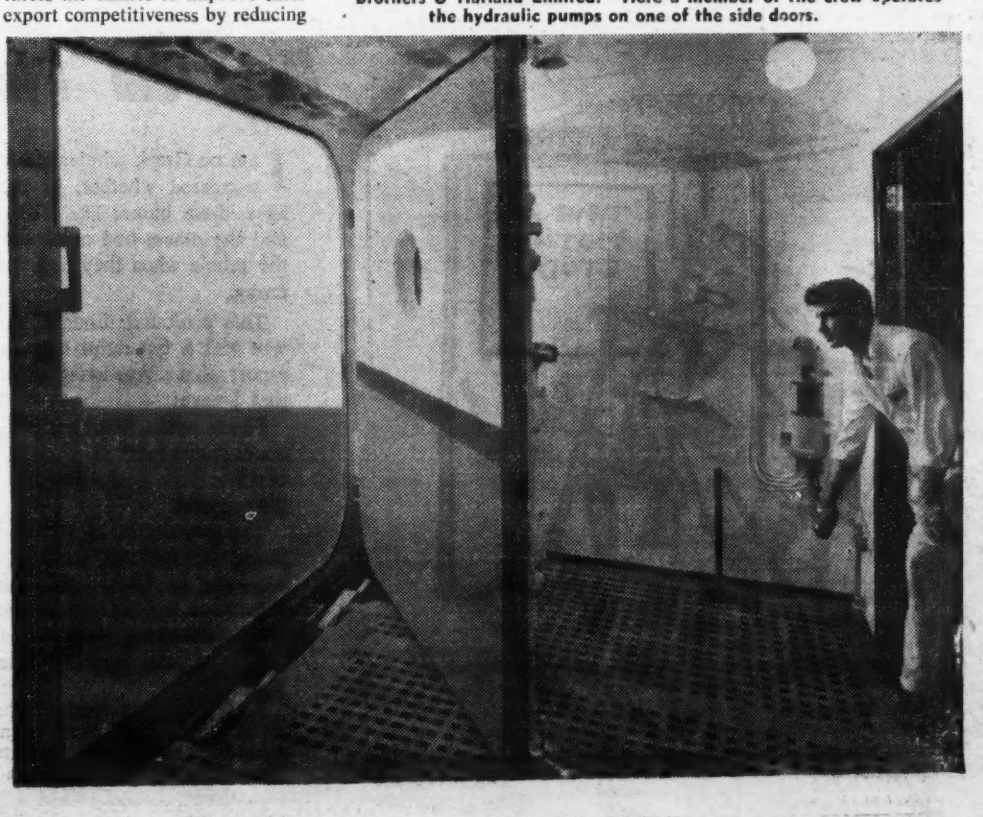
"It is essential that we should get the costs of production down," he said. What happens when a Credit Squeeze is applied is perfectly well known. A company may be busy with orders and overnight the customers have to cancel or postpone acceptance.

"This may mean laying men off. Obviously the dislocation is serious and expensive. Then when the squeeze is taken off the orders come flowing back again, delivery dates lengthen, and perhaps some of the customers are lost elsewhere.

"I believe that the large Common Market will give steadier conditions and some relief from this stop-and-go progress, at the same time bringing a great deal of very serious competition."

NEXT WEEK

Swansea



This ship-side door of the Windsor Castle, flagship of the Union Castle Line, is operated by a hydraulic system designed by Short Brothers & Harland Limited. Here a member of the crew operates the hydraulic pumps on one of the side doors.

CHRISTMAS

DESIGNING DESIGNER

The designer leaned across his board,
Wonderful things in his head were stored,
And he said, as he rubbed his throbbing bean,
"How can I make this tough to machine?
Now if this part were only straight,
I'm sure the thing would work first rate,
But would be too easy to turn and bore,
It would never make the machinist sore,
So I'd better put in a right-angle there,
Then watch those blighters tear their hair.

☆

I'll put the holes which hold the cap,
Way down inside where they're hard to tap,
Now the thing won't work I'll bet a buck,
'Cos it can't be held in a vice or chuck,
And it can't be milled, and it can't be ground,
In fact the design is exceedingly sound."
He looked again and cried, "At last,
Success is mine, it can't even be cast!"

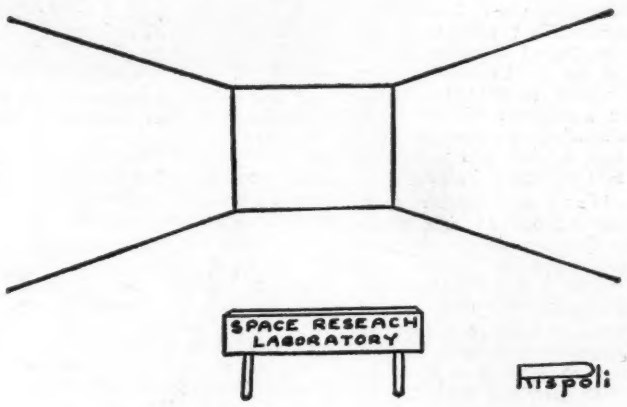
(Reproduced by courtesy of King News Letter, Geo. W. King Ltd.)

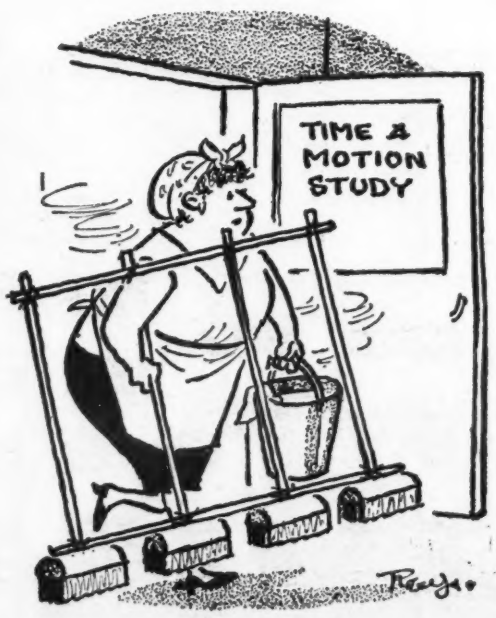
"Everytime she walks through the shop, there's an accident."

"Morning Brother."

Memo sent from an inspector to a materials engineer

I GIVE below details of the felt which was mentioned during our recent telephone conversation. This was ordered on Messrs. Blank Ltd. as Code 2|326|26210, which applies to artificial silk. The specification QX491 refers to **black** *felt, the material was advised as* **brown** *felt and* **green** *felt has been delivered. The material as delivered has been found to be satisfactory for the purpose required.*





How did Plato and Pluto fare with the rabble?

by HAMMOND BACON

I am no Greek scholar but I have often wondered whether, in those far off ages, these blokes like Plato and Pluto and the others had much difficulty with the rabble when they had finished chattering.

This profound thought arose when I was sent a typescript that purported to report what a tape had captured of a talk that I gave.

I have never, in all my puff, read such unadulterated drivel. It was then, in a blinding flash, that I saw the purpose of the preprint.

The preprint is, of course, one of the major occupational diseases that have come out of America and ranges alongside ulcers, psychiatry, and space competition (advertising and cosmonautic), and hitherto I have regarded it as a pain in the neck.

Any American society can produce some hundreds of these in a year and since their titles are catchier to the technical eye than the cover of a paperback edition of the **Birth of a Nation** is to a teenager, the revenue at 75 cents a touch must be considerable.

But there can be disadvantages. Armed with a preprint, a man can go to a paper with his discussion points prepared and so confuse the poor perishing speaker (who has already been reduced to frayed string by the prospect of **his** paper) that he will leave the platform, never to be seen again.

Many a promising career has been cut off in this way.

In the case of a civil engineer it doesn't matter so much. He doesn't deliver his lecture until his bridge is built or his drain is dug or his road has been proved inadequate for modern conditions.

But people like electronics engineers who talk about ideas rather than accomplished facts tend to be discouraged while they are still semi-conductors and have not even reached full conductorship—or c'hood.

None of these conditions could obtain in the days when institutions and A1 at Lloyds were founded in coffee houses. Brunel and Stephenson and that lot **may** have had a script hidden in those tall hats they wore but I doubt it.

They probably sat down to a mug of coffe (with no thought of whether it was about America's favourite either) and just talked about the Britannia Bridge or the road to Holyhead or how many wheels the Rocket should have.

No dismal Jimmies there to say that the bridge would get the wobbles in the first gale and look at that film they showed where a car went for a Burton. Nobody to talk about the soil mechanics in Edgware Road compared with the bit that skirts Wales. Nobody to complain that the Rocket had no guard's van so how would people get in at Surbiton. (Bitching or Beeching came much later).

Those, indeed, were the days. No Preprints. No discussion. Noblesse oblige.

CRACKERS

"Do you think you can manage it? "

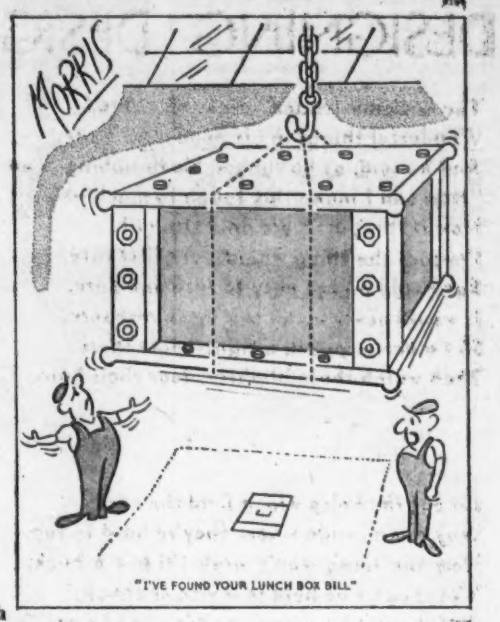
"PLEASE CAN WE HAVE OUR BALL BACK?"

SCIENCE AND TRUTH

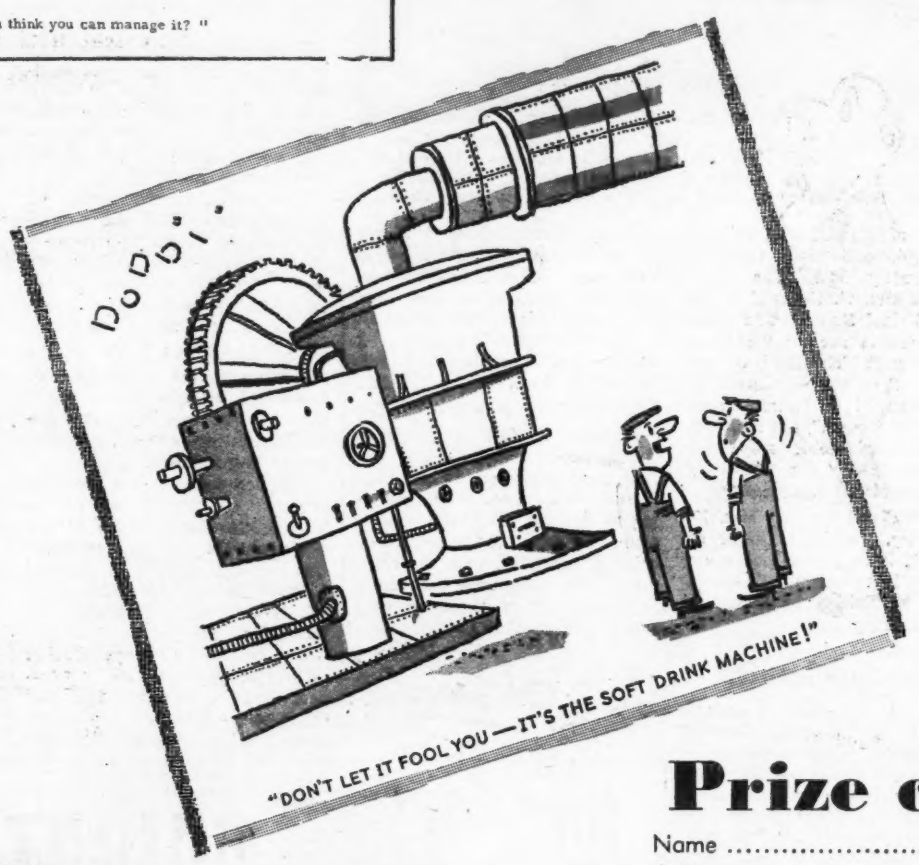
Don't be misled by fact

The first law of thermodynamics — "If anything can go wrong with an experiment it will."

The second law of thermodynamics — "If experiments are to be reproducible, they should all fail in the same way."

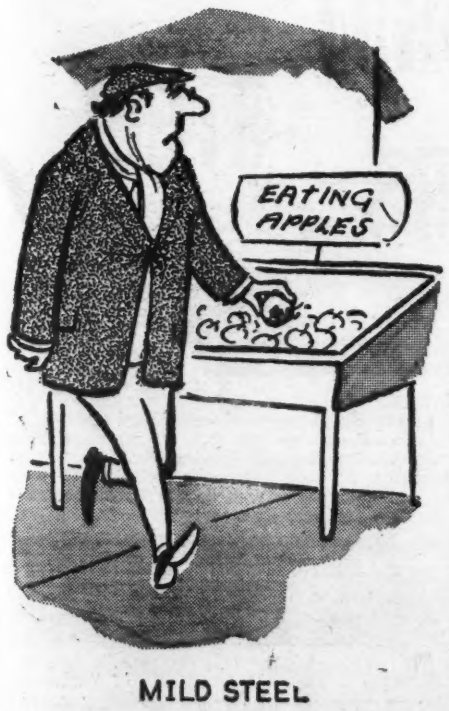


"I'VE FOUND YOUR LUNCH BOX BILL"



"DON'T LET IT FOOL YOU — IT'S THE SOFT DRINK MACHINE!"

"And now long have you been an electrician?"



MILD STEEL

"I HAD IT FRAMED AND IT WON SECOND PRIZE IN A MODERN ART COMPETITION ..."

Prize crossword

A guinea book token will be awarded for each of the first five correct solutions opened. The Editor's decision will be final and no correspondence will be entered into. Closing date Dec. 27.

Name .....

Address .....

ACROSS

1 His teacher's table turns into metal (5, 6, 5)

9 Jones, the architect, looks blue, having swallowed a penny (6)

10 Saintly academician in state of stress (6)

11 Used for strengthening framework — of the corner club perhaps (5, 4)

12 Cannot be called a square, even in these days (6)

17 Strive after seeing the principal lowered down (11-4, 6)

20 Determines the shape of things to come? (6)

23 Ant trouble loses nothing and can rotate (4-5)

24 When found it has usually left a mark (6)

25 A nice distinction between things (6)

26 Mobile lift-ups for migrating birds? (10, 6)

DOWN

2 What I did in the race in the Middle East (4)

3 More likely to be grasped when it has a name (6)

4 Separate any sale into constituent parts (7)

5 Skill will, undoubtedly, produce this leg up (7)

6 A lion laid out for floor covering (4)

7 Great little Edward is fanatically affected inside really (7)

8 The gent's code needs translating — it's so closely crowded (9)

10 Samples for instance? (9)

13 Initially, it's an establishment which supports its country's subjects? (3)

14 Shape of an underground line (7)

15 How convenient it lets out what one puts a claim to (7)

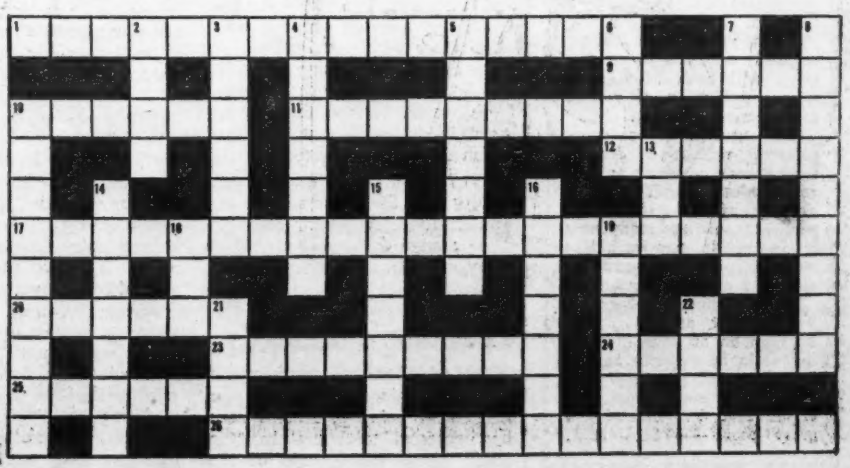
16 An original forerunner of 20 (7)

18 Point the wrong way for a bush (3)

19 Red for a start — as country folk are (6)

21 Let it stand that an American raises his son (4)

22 The facts available, thanks to the District Attorney (4)



ENGINEERING NEWS

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Thursday, December 21, 1961

An £800,000 compliment

INDUSTRY is not slow to criticise Government departments for their lack of initiative and slowness to accept new ideas. They must, however, give some credit to the National Research Development Corporation whose 12th Annual Report discloses record activity during the 12 months ending last June.

The fact that the corporation's development expenditure nearly doubled over the previous year to a figure of over £800,000 is not necessarily an indication of growing activity because this figure is a small amount compared with the total research expenditure in industry.

The influence and scope of the NRDC in fact covers a great many inventions which do not show in its accounts because some are passed on to research establishments who are already qualified to deal with them.

* * *

The corporation, which is almost unique and whose organisation is a constant source of interest to other countries, is playing an important part in encouraging co-operation in development projects, many of which are in the engineering field.

It has persuaded three major British companies to co-operate on development of fuel cells and its part in stimulating the development of Hovercraft (now a registered trademark) is well known.

In many fields where research and development costs are high, such as aircraft and computers, co-operative research is essential to avoid waste. In this type of work the NRDC has made an important contribution.

* * *

A look at last year's figures shows that revenue from exploitations of inventions will hardly meet the corporation's expenditure in the immediate future.

In view of the relatively small amounts involved this does not indicate a national calamity, but what is more important is that worthwhile inventions, by small companies and individuals as well as by large firms, are being given a real chance to prove their worth.

Tomorrow's technology

Inventiveness should apply not only to technical products but also to the procedures of operating a business.

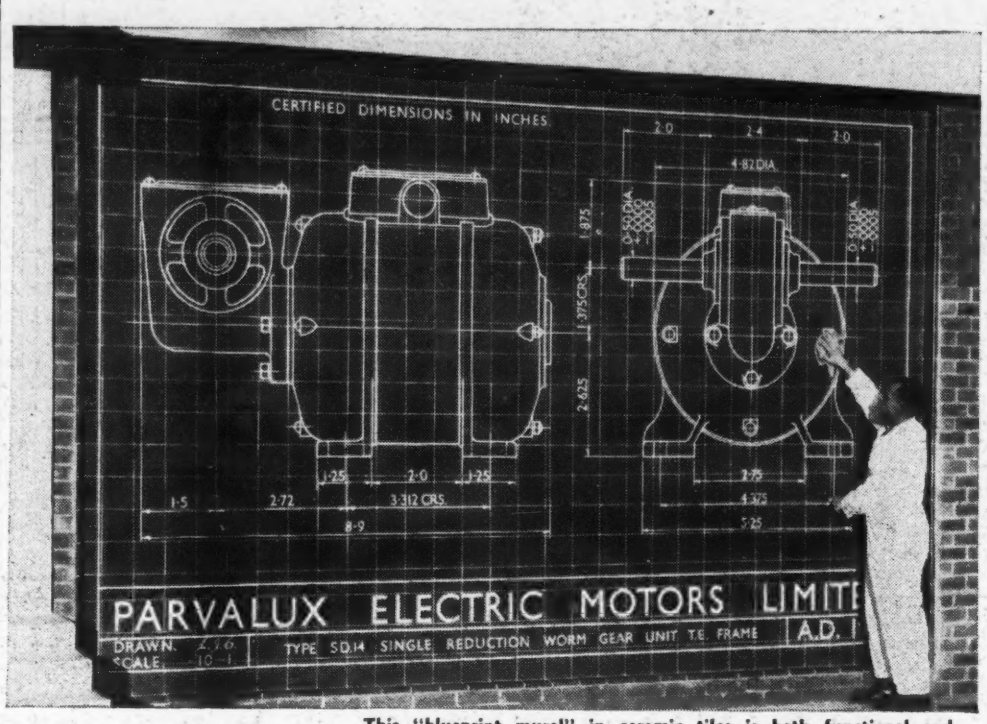
Already this is being realised and the next ten years will undoubtedly see wider application of formal management training.

Management is a complicated profession dealing with human problems as well as technical ones. The introduction of automation, in particular, creates many new human problems in retraining and adjusting people to different working conditions.

New methods of educating management and staff will be seen on an ever increasing scale in colleges and in industry, and gadgetry such as films, simulators and closed link TV will play a great part. — SCANNER.

An Engineer's DIARY

This blueprint has place of honour



This "blueprint mural" in ceramic tiles is both functional and attractive. It advertises the company's products (fractional horsepower motors), provides a first-class external wall cladding and the maintenance required is only a rub with a damp cloth.

WHEN Parvalux Electric Motors decided to put an eye-catching mural in the entrance to their new headquarters they hit on the bright idea of using a blueprint of one of their products.

The print was reproduced on frost resistant blue tiles with outlines raised in white.

This seems a jolly good scheme, but I hope that the drawing was checked to ensure that it incorporated the latest amendments. I should also like to know how they intend to cover further changes when they come along.

We in Britain have a reputation for hanging on to faithful designs whereas in the States they go to the other extreme and make sure that obsolete drawings are automatically destroyed.

I can give some support to the British attitude when I recall my former firm receiving an order for equipment used on old aircraft sold to a foreign power.

If we had not been able to turn to our archives we would have been faced with a tidy problem. Incidentally, I thought third angle projection was the accepted standard these days? Somebody had better put through a change note on one mural.

Sales by design

TALKING TO Mr. R. Addie, the Marketing Director of E.M.I. Electronics Ltd. over lunch, I was interested to learn that he was responsible for design in addition to his commercial duties. When I was engaged on design and research, I always thought that I had more in common with sales than with production. It seems logical that design should be the responsibility of the marketing director, because there is no point in designing a product for which there are no customers.

I am sure a closer link between design and the customer is required in the engineering industry. Too many designers are shut away, out of touch with customers' reactions.

Female standards

FOLLOWING the recent article in "Engineering News" on women in industry, readers may be interested to know that the total female membership of the Register of Standards Associates is now 4, out of a total of approximately 300. The latest recruit is Mrs. G. Underell of the National Coal Board. The other three members are on the B.S.I. technical staff. The B.S.I. do not feel that they are in danger of being swamped by "a monstrous regiment of women", but they feel there is considerable scope for expansion here. Are there no women Standards engineers?

Incidentally, I see that Mrs. D. M. Cowley, Technical Officer of the B.S.I., is to give a lecture on January 31 at Watford Technical College on British Standards in the engineering field.

Base mechanics

I WAS a little shaken when I read in the December issue of Target the following paragraph:—

"If the electronics engineer provides the brains of the new machinery to run tomorrow's industry someone must provide the muscles."

The "someone" was referring to the mechanical engineer and this extract was taken from a contributed article setting out the task of the Institution of Mechanical Engineers.

What grieves me a little is that the way in which this paragraph is phrased suggests that the mechanical engineer is a sort of mate or assistant to the electronics engineer.

Perhaps this paragraph was written by an electronics engineer; or maybe we mechanical types are too prone to hide our lights under a bushel; or perhaps I am just old-fashioned.

Binary promotion

I WONDER if computers will be used by industry to pick men for vacancies. The thought is prompted by the news that the United States Strategic Air Command is now employing this method to pick personnel.

Apparently, they can find the necessary answer in two minutes, but I would not like to think that suitability for a particular position could be so coldly assessed without personal contact. Personality is an important factor and this can only be imparted face to face in conversation. It is not always the man with the superior knowledge of a specific subject who is chosen, but one who commands respect and can infuse enthusiasm into others. I doubt whether such qualities can be broken down into a formula for a computer.

Perhaps a fair compromise would be to compute the job into basic requirements and then interview only those people claiming to fit the bill. If the process could be married to the records of existing personnel, then the computer may well be instrumental in promoting an employee who would otherwise be overlooked.

John Heywood

by our own correspondent

Computer investigation of rolling mill drives

AN appeal for more extensive use of analogue computers in project and design work is made by the Head of the Computer Centre of the Moscow Power Institute, A. Nazarenko, and two fellow computer specialists in an article in the current number of the Economicheskaya Gazeta.

The interesting feature of the article is that he should have gone to a great deal of trouble to convince his readers.

He pointed out for example that as project work is currently performed many factors are frequently not taken into account and that where it is impossible to build a trial model, as in rolling mill production, mistakes occur involving waste of materials.

The main difficulty impeding development in this field is apparently the lack of mathematical formulations of the various technical processes. Dr. Nazarenko calls for a greater effort in this field.

Some work recently undertaken by a group from the Power Institute and the Electro-Steel Heavy Engineering Factory using analogue computers in an investigation of the drive of one of the cold rolling mills.

The group in the course of its work determined the magnitudes of the forces in the parts of the drive and the loads on the motor for 162 different design variants and operational regimes.

* * *

The tempo and work on the development and production of automated electric motor drives seems to be causing some dissatisfaction in the Soviet electrical engineering industry.

The first reaction has been the proposal of organisation of research into this problem in the newly created electrical engineering institutes and in its Central Scientific Research Institute (Vestnik Elekropromyshlennosti, No. 10, 1961).

The cry for better organisation and more co-ordination is however standard in the USSR and seems to go on incessantly apparently leading only to a further cry for yet more co-ordination.

In regard to motors for rolling mills the call is for 6,800-12,000 h.p. motors and generators of up to 8,500 kilowatts all having technical characteristics exceeding the "best foreign models". An improvement is demanded in the reliability of mercury rectifiers which does not at the present time answer to the needs of Soviet industry.

The same position holds in regard to magnetic amplifiers.

* * *

The Draft programme of the Soviet Communist Party lays it down as a task of Soviet science in the next twenty years to secure the foremost position in world scientific developments.

How this should be done in the field of atomic science is the preoccupation of an article by Dr. V. S. Emel'yanov, the Head of the State Committee for the Utilisation of Atomic Energy in the current number of the Herald of the Academy of Sciences (Vestnik Akad Nauk No. 10, 1961).

Strictly speaking Dr. Emel'yanov does not really answer the question, leaving it to the reader to believe that in the field of atomic science the USSR is already in the leading position.

He does, however, reveal some plans for the future development of Soviet atomic science.

In the near future we are informed Soviet physicists will have at their disposal new accelerators ranging from 1 milliard to 50-70 milliard electron volts.

The 50-70 milliard proton accelerator being designed by a group led by Academician A. I. Alikhanov will have an overall length of 3.5 kilometers and its magnet will weigh 20,000 tons.

Apart from proton accelerators currently in the construction stage in the USSR are two high power electron accelerators; one a ring type with energy of 5-6 milliard electron volts for the Institute of Physics in Erevan, Armenia, and the other a linear model of two milliard electron volts in the Physico-Technical Institute of the Academy of Sciences, Kharkov.

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U.S. SETTING AID AVAILABLE

Precision inserts give reference surface for toolmakers

SETTING up to machine compound angles often calls for the use of a ground ball to provide a reference surface, and most toolmakers keep a few ball bearings of various sizes by them for work of this kind. An American firm, Industrial Tectonics, produce tooling balls consisting of hardened stainless steel balls mounted on hardened and ground shanks specially for compound angle work and they are now available in this country.

Two basic types are offered: fixture balls and checking balls, and they are made in seven sizes from ¼in. to 1in.

Fixture balls have plain parallel shanks; the limits on the ball diameters are ± 0.0001in. and the tolerance on the shank diameters is 0.0003in.

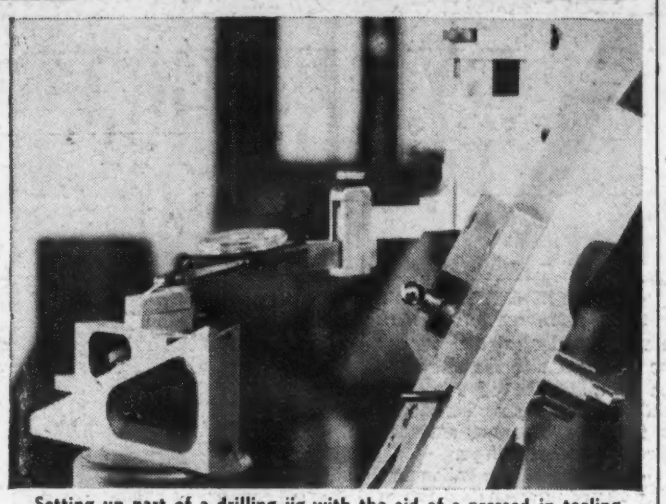
They are designed for permanent fitting to jigs and fixtures and can also be supplied with tapped shanks for pulling into position or for locking purposes.

Ground shoulders

Checking balls have ground shoulders on the shanks to permit positive location and replacement and are made to closer tolerances; ball diameters are held to within ± 0.00002in. for the smaller sizes and the tolerance on the shank diameters is 0.0002in.

The balls are obtainable as separate items or in boxed sets. As an indication of price, a set of seven different sizes of checking balls in a mahogany case costs £27 10s.

They are marketed in this country by Insley Industrial, 5 Windmill Street, W.1.



Setting up part of a drilling jig with the aid of a pressed-in tooling ball In this case the correct angular relationship is obtained when the parallel pin is horizontal and is at a previously calculated vertical distance from the ball.

PORTABLE FLAW DETECTOR

INDUSTRIAL instrumentation previously manufactured under the Kelvin Hughes trademark is now handled by Smiths Industrial Division who say that a number of new pieces of equipment will be shown at the Physical Society's exhibition which opens in London on January 15.

Among the additions is the Mark 7 ultrasonic flaw detector, designed to be of value for both research and production testing.

A number of transistorised plug-in units are available to increase the scope of the basic instrument without affecting its portability and they provide automatic recording, also gating and monitoring circuits.

Selected depths

The plug-in units include a flaw alarm system with automatic gain control giving visual or audible warning of the presence of flaws within selected depths of the test material and a swept gain unit permitting an adjustable bias to be applied to the receiver so that sensitivity of the probe can be maintained against variations in scanning depth.

Other new components introduced by Smiths include a number of instrument motors and a capsule-operated pressure switch designed to withstand high values of shockloading and vibrational acceleration.

Glass insulant can protect hearing

ABOUT three-quarters of the workers in a Swedish factory were found to suffer varying degrees of deafness due to their noisy environment. Similar evidence of environmental hazards exists in this country.

This point was made by two Swedish surgeons, Mr. Gunnar Liden and Mr. C A. Heijbel, when they addressed a conference last week arranged jointly by the British Safety Council and Ardente Industrial Services.

Research in the field of industrial ear protection has led the surgeons to recommend the use of glassdown, known in Britain as Anti-Noise. This is a cotton wool like material made from microscopically thin glass fibres.

Noise reduction

The wearing of Anti-Noise ear protectors reduces the noise of a weaving mill to the level of a busy street and the sound of a riveting machine to that of a paper machine.

British selling rights for the material are held by Ardente Industrial Services, an organisation specialising in aiding industrial concerns with difficult noise problems.

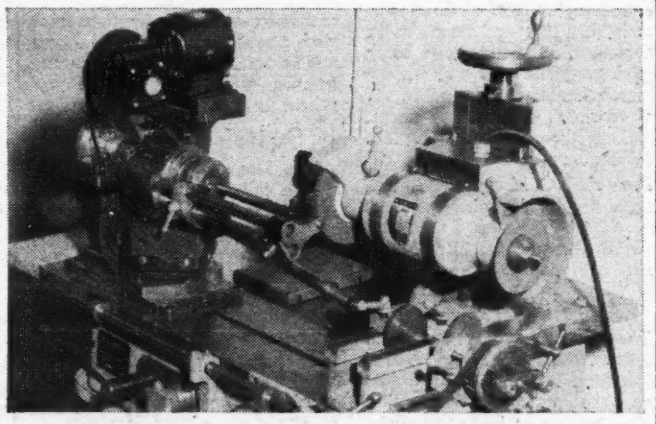
In some European countries and in parts of the U.S.A. the medical hazard of excessive noise is covered by Government regulations, but in Britain there is no automatic compensation for deafness from industrial causes.

The Wilson Committee on Noise recently set up to investigate various aspects of noise will certainly consider this problem, and their recommendations may result in suitable amendments to the Noise Abatement Act of 1960.

50kW BULB

Tokyo Shibaura Electric Co. (Toshiba) is reported to have developed a 50kW electric bulb. It is 52.6cm. diameter, 92cm. long, and weighs about 50lb. Used with a reflector, it is 47,300 times brighter than an ordinary 100W bulb.

GRINDING ATTACHMENT AIDS TOOL SHARPENING



An attachment (right) developed by Lorant Engineers, allows helical cutters to be form relief ground along their entire length. It is shown fitted to the American Royal Oak grinding machine.

AN automatic timing device for form relief grinding of helical cutters and similar tools has been developed by Lorant Engineers, High Street, South Norwood, London, S.E.25, for fitting to the American Royal Oak grinding machine.

This attachment is largely exported to the U.S. or users of this particular grinding machine, but the principle can be used on similar types of grinders.

The Royal Oak fixture operates by means of a cam which is connected to the work spindle.

Cam operated

The cam has the same number of drops as there are teeth on the cutter to be ground and as the work is revolved the cam works against two roller followers and causes the work to move in closer to the grinding wheel and generate the form relief.

By altering the angle of the bottom slide it is possible to obtain radial and actual relief in any desired combination.

When it is required to form relieve helical cutters such as drills, it is necessary to incline the axis of the work by one or two degrees in order to produce a parallel cutting edge.

When the helical edge of the cutter is moved towards the wheel at right angles to the axis of the cutter more material will be removed from the left-hand portion of the surface being ground thus producing a non-parallel cutter.

By turning the axis through one to two degrees this action is cancelled out.

The normal method of producing long helical cutters is to plunge-grind them in a series of steps and blending each step with the one preceding it. It is also necessary to retime the work in relation to the cam at each operation.

With the automatic timing attachment long helical cutters can be produced at one setting and the width of the grinding wheel is not important.

The basic principle of the attachment is to add on a small rotation to the work through a differential mechanism as the table is traversed across the wheel.

Council hits at 'cheap labour'

SOME employers were accused of using young people entering the engineering industry as "cheap labour" in "backyard" places of employment by Mr. J. Turley of Wednesbury Trades Council, recently.

He was speaking at a meeting of the Midlands Federation of Trades Councils, at Newcastle-under-Lyme.

He submitted a resolution: "this federation believes that the whole problem of craft apprentices and the best use of their ability should be taken up by the TUC, and particular regard given to the intake ratio of boys to skilled men in the various industries".

The federation approved the resolution.

Mr. Turley said boys were being exploited in engineering trades in the Midlands. Engineering was the chief industry which young people leaving school could enter, and the craft apprenticeship scheme required a new examination and overhaul.

"If boys want to get into a particular engineering trade," he added, "they have an inducement to take the unwise step of taking up backyard employment."

WELDING INSTITUTE CREATES PROTECTIVE COATING DIVISION

THE Council of the Institute of Welding has announced the creation of a Metal Spraying and Plastic Coating Division. This results from negotiations with the Metal and Plastic Coating Association, the Association of Metal Sprayers, and other interested organisations.

The establishment of the division is an important step forward in the progress of metal spraying and plastic coating technology.

An executive of a large welding organisation told Engineering News that such techniques had reached the stage where it was necessary to lay down suitable standards which would ensure that industry reaped full benefit from their application.

Meeting in May

Plans are being made for a one-day symposium to be held next May. Preparation of a syllabus for metal spraying specialists who wish to become corporate members by examination is also under way.

A provisional committee has been formed and officers elected include: the chairman, Mr. H. W. Fender (Prodorite); vice-chairman, Mr. R. A. Parkes (Metallisations), and secretary, Mr. G. A. Curson (F. W. Berk & Co.).

Kearns book for students

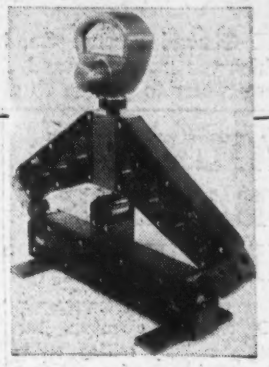
A FIRM of Manchester tool manufacturers, H. W. Kearns & Co., have produced a booklet giving step-by-step instructions on the construction of a Geneva mechanism as a practical exercise for apprentices and students at technical colleges.

The completed model consists of a cast box (it may also be fabricated from sheet) enclosing the Geneva mechanism with an operating handle at one side and two graduated discs which allow the rotation of driving and driven shafts to be compared at the other.

Basic operations

In the construction of this model the student will gain experience in basic machining operations such as turning, boring, milling and tapping; it can also be used as an exercise in pattern making and casting.

The booklet contains full working drawings and descriptions of the major machining operations.



Cylinder gauge designed to measure 14in. photogravure cylinders. The setting master has three hardened rollers to simulate the reference diameter.

Comparator checks large cylinders

A SPECIAL purpose measuring instrument for checking the diameter of 14-in. cylinders to an accuracy of 0.00005in. was delivered recently to a Canadian publishing firm by Thomas Mercer's of St. Albans.

The gauge is to be used for measuring photogravure cylinders which are skimmed down to a smaller size after each printing run.

In the illustration the gauge is shown resting on the setting master which corresponds with a nominal diameter of 13.7215in. Both gauge and master have been designed to be as light as possible in view of their size and they are insulated to minimise distortion arising from the heat of the operator's hands.

Close grained cast iron is used for the arms of the gauging head and the locating pads are made from tungsten carbide.

In use the gauging head is placed on the master and the reading on the dial set either to zero or at the plus end of the scale. The head is then transferred to the cylinder to be measured and the difference in readings noted.

WORLD STANDARDS

THE American Standards Association (ASA) have published B 18.11-1961 which not only covers standard dimensions for threads but also for slotted head miniature screws having the dimensions covered by the American Standard B.1.10:1958; these being used for a variety of purposes from tiny parts for watches to sub-miniature parts for controlled mechanisms and precision instruments.

Standard B18.11-1961 incorporates the provisions of the American Standard B1.10-1958 for Unified Miniature Screw Treads.

The Standard sponsored by The Society of Automotive Engineers and the American Society of Mechanical Engineers agrees substantially with ISO Recommendation R 68, which provides for the basic profile for triangular screw threads and basic sizes in the major diameter range 0.25 to 5mm.

The American Standard covers 14 sizes distributed systematically through the range, offering a uniformly proportional selection covering dimensions and tolerances for threads for screws having nominal diameters of 0.0118 to 0.0551in. (0.30 to 1.40mm.).

From Europe comes news of two German Standards for fine pitch metric threads (4mm.) DIN: 13B1.40 and also metric threads with fine pitch 6mm., DIN:13 B1.41.

These standards being based on the Draft ISO Recommendations for ISO metric screw threads having a range 0.25 to 300mm.

PUBLISHED last week as an extension of the range of British Standard lubricating nipples, B.S.1486-Part 2, introduced two types for machinery heavier than that covered by Part 1 for machinery and vehicles.

Also covered are the overall dimensions, types of threads, and materials for their manufacture.

Where a more robust nipple is required the Standard puts forward the industrial type having a button head profile.

For machinery requiring heavier bodied lubricant in large volumes, a new type known as the giant button head, has been introduced.

This replaces the locomotive type nipple of a previous edition which has been excluded due to its limited application in present day design and practice.

Similarly to Part 1 a change has been made in the screw thread and the unified fine thread has been specified for ¼in. and ⅜in. types, but for the ¼in. and ⅜in. types, the BSP fastening thread has been retained.

An appendix to the Standard gives notes on the spacing of nipples and also refers to the precautions to be taken in the use of high pressure lubricating equipment, especially when power operated.

FOREIGN NEWS . . . . . FROM OUR OWN CORRESPONDENTS

METAL FORMING BY ELECTRO-HYDRAULICS

Metal, die, electrode assembly submerged under water

SCHENECTADY, N.Y.

THE General Electric Co. has developed an electro-hydraulic metal forming process in which the metal, die and electrode assembly are submerged in water and electrical energy converts water to plasma to give a shock wave which stretches the workpiece to die shape.

The metal formation takes place in millionths of a second. This new metal forming process utilises electric arcs instead of conventional chemical explosives to fabricate titanium, niobium, columbium, stainless steel, tungsten, and beryllium alloys.

Demonstrated successfully at GE's General Engineering Laboratory, the electro-hydraulic process is now being offered in a standard line of metal forming equipment by the company's Speciality Transformer Section, Holyoke, Mass.

The equipment is particularly applicable to metal forming problems of the nuclear, missile, and aircraft industries.

Electrohydraulic metal forming eliminates explosion shelters remote from production lines, special handling methods, and other time and cost-consuming procedures, according to Max I. Alimansky, general manager of GE's High Voltage Speciality Transformer section.

High accuracy

Alimansky added that electro-hydraulic equipment is adaptable to installation in a production line, requires a rather small die and operates in a simple, repetitive fashion, and features high accuracy of part reproduction.

Conventional metal forming presses cannot usually handle brittle and hard materials.

Even where possible with a standard press, the additional tooling for a series of dies and multiple passes with intermediate heat treatments makes it more expensive than electro-hydraulics.

In the operation of this equipment, the metal, die and electrode assembly are submerged in a tank of water. An AGE capacitor bank, charged by a high-voltage power supply, releases electrical energy in an arc which heats, vaporises, then converts the water to plasma.

Shock wave

The rapid heating and expansion of the plasma produces a shock wave which forces the metal to conform to the shape of the die.

Metal sheets up to 20in. wide and 3/32in. thick have been formed by this process and the company says fabrication of larger workpieces may be possible.

The new 20kV metal forming equipment is available at 12,500 to 50,000 Joules and 62.5 to 250 microfarads capacitance. Prices range from $11,000 to $26,000.

RAILWAYS WEATHER CHAMBER

VIENNA

TWO climatic chambers for testing railway rolling stock and locomotives under extreme weather conditions are shortly to be put into operation near Vienna.

Their construction was decided upon by the International Union of Railways in 1955 and preliminary studies began in September 1958.

In the new chambers it will be possible to study all the heating, ventilation and climatic problems which occur in railway operation, under artificially produced conditions, with variable humidity, and at temperatures between −40° and +50°C.

40 sec. grey iron test

COLUMBUS, OHIO

AFTER eight years of research, a method which determines in 40 seconds the carbon equivalent of hypoeutectic grey cast irons has been perfected by the Gray Iron Research Institute Inc.

The test is much faster than by chemical analysis and is based on the measurement of thermal arrest temperature as a sample of molten cast freezes.

Arrest heats correspond to certain phase boundaries in the iron-carbon phase equilibrium diagram.

ANTI-HEAT TYRE FOR 2,000 m.p.h. AIRCRAFT

So hot it boils water! To prove this tyre's ability to stand heat generated by air friction at three times the speed of sound, the B.F. Goodrich Co. exposed it to 360° F. for several hours.

CLEVELAND, OHIO

A RADICALLY new aircraft tyre capable of withstanding tremendous heat, loads, and speed for the 2,000 m.p.h. B-70 aircraft has been developed by the B. F. Goodrich Co.

Conventional aircraft tyres would be virtually destroyed by the heat inside the B-70 wheel wells while the aircraft is in flight, a company official said.

Heat is generated by air friction at supersonic speeds. Even with insulation, the tyres will be subjected to oven-hot temperatures while in flight.

In tests at the Aeronautical Systems Division, Wright Patterson Air Force Base, the tyre, made of a new rubber compound, completed the prescribed number of simulated B-70 flight cycles (take-off, flight mission and landing) and was still in good operating condition.

This included exposure to 360°F for several hours between simulated take-off and landing on the laboratory test wheel.

Conventional-type tyres failed before completing a single cycle. In addition to its heat resistance, the new tyre is stronger, smaller, and lighter than conventional aircraft tyres of equivalent load capacity, and is believed to incorporate new concepts of carcass construction.

IRON FURNACE HOLDS 30 tons

Tilting the 30-ton mains frequency furnace at Guldsmedshytte Bruk, Sweden. The ladle is lowered into a pit below floor level.

STOCKHOLM

WITH a capacity of 30 tons, one of the largest mains-frequency crucible type furnaces in the world for the melting and holding of iron has recently been installed at the foundry of Guldsmedshytte Bruk, Sweden, by Allmanna Svenska Elektriska Aktiebolaget (ASEA).

Such large furnaces have not previously been built for iron because of the problems of designing the crucible and lining.

For crucibles of normal type, which are lined with either acid or basic material, the surface of the crucible must be sintered for the first melt. The sintered surface is very thin and functions as a dome while the furnace is being tipped, supporting the powder-like unsintered material behind it. If the crucible diameter is large, therefore, there is a danger that the dome may cave in.

For the Guldsmedshytte furnace a pre-fired, graded quartzite was chosen for the furnace material after a series of full-scale sintering trials.

Insulated roof

The furnace has been sunk into the floor, the ladle being lowered below floor level for tapping. To keep the energy consumption during holding as low as possible, the radiation from the surface of the bath is restricted by a well-insulated roof operated by a lifting device.

The furnace body is built into a framework which can be tilted about the tapping spout of the furnace and consists of a coil with transformer yokes built into a system of girders which can be lowered into the framework and locked. If a fault develops in the crucible, yokes or coil, the complete furnace body can be replaced.

For normal crucible replacement, a separate, rammed furnace body can be held ready when the crucible in use is nearing the end of its useful life. Ramming time can thus be eliminated at the changeover.

For weighing the charge, the furnace is placed in a frame-work resting on transducers, the output from which is transmitted to an indicating instrument. At the commencement of charging it is also useful to know how much molten material remains in the furnace, especially when the new charge is of different composition.

Switched sections

The furnace has been provided with a coil in three sections which can be switched in as required. This is primarily in order to achieve greater flexibility of power supply to the different sections of the furnace.

Principal item of electrical equipment for this mains frequency furnace is a 2,100 kVA regulating transformer with a number of tappings. The furnace is single phase and is connected to the secondary winding of the transformer, an adjustable capacitor and reactor balancing the loading on the three sections of the heater coil. Tap changing is carried out by motor-driven gears operated by remote control.

TWO FIRMS ANNOUNCE STEELS DEVELOPMENT

TOKYO

TWO Japanese companies announce the successful development of special steels, and each has applied for patents in some 12 countries.

Kawasaki Steel Co. are in production with a cold rolled non-ageing rimming steel with, it is claimed, an exceptional deep draw quality which has been developed by a special ingot casting and heat treatment process.

Known as "KTS steel" it is hinted by their associate Okura Trading Co. of Tokyo, that a special composition adjustment is made on rimming steel in the steel making process and cold rolled steel sheet so produced is heat treated by the Lee Wilson open coil annealing process.

The company say surface conditions are superior to any cold rolled steel sheet so far available and expect the sheet to find applications in the automobile and electrical industries.

The other company, Ishikawajima-Harima Heavy Industries, announce that they have developed a notch ductile steel, called IN steel, which is claimed to be stronger than steels so far produced.

It is expected that production will commence next spring and manufacturing times are said to be much less than conventional processes. IN steel is claimed to be ideal for welded structures as no brittleness occurs. Use in shipbuilding is likely.

GR-100 solves problem of indium wetting

NEW YORK

INDIUM wetting problems in a ceramic jig for controlled alloying of semiconductor materials are claimed to have been overcome by a new material called GR-100 for the alloying jig now being manufactured by Duramic Products Inc., of Palisades Park, New Jersey, U.S.A.

The material is said to be heat resistant to 2,000°F, able to withstand rapid and continuous cycling, and have a low expansion rate.

Tests have shown the material to be superior to stainless steel and graphite tooling for many applications. GR-100 is one third the weight of stainless steel and four times the hardness of graphite.

It is reported by the company that a semi-conductor manufacturer, using the material under continuous operation, has completed over 2,000 cycles without one instance of wetting or dimensional change.

Electricity from heated metal

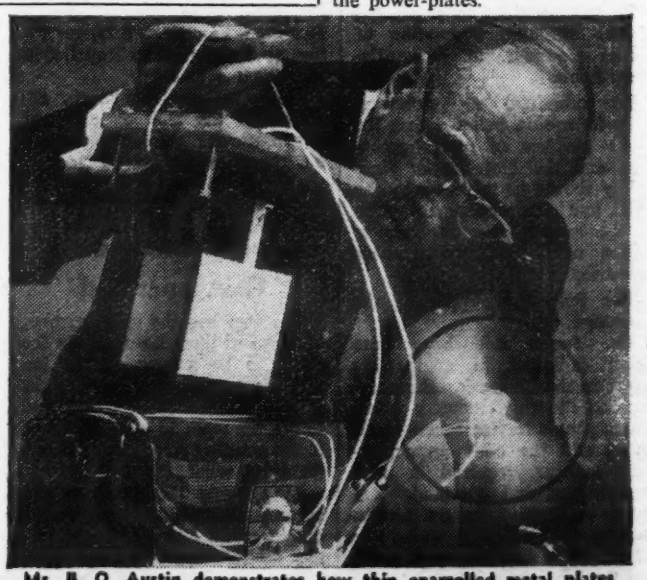
NEW YORK

MEMBER of the research team of Westinghouse laboratories Mr. B. O. Austin has discovered a new way of obtaining small quantities of electric power.

While working on aero-space research, he coated two thin metal plates with a combination of enamel, iron, and silver, and heated them for a few minutes in an electric toaster.

When he took the plates out of the toaster they were charged with electricity and could operate a small electric motor and its propeller for a considerable length of time. They could be recharged in the toaster in the same way as the battery in a car.

Scientists at the Westinghouse laboratories see in the "Austin effect" a method of securing electric current for space ships of the future, using the friction-heated "skin" of the space vehicle to heat the power-plates.



Mr. B. O. Austin demonstrates how thin enamelled metal plates can become miniature power plants when heated in an ordinary electric toaster.

EDUCATION and TRAINING

PROFESSIONAL BODIES ALTER NATIONAL EDUCATION POLICY

THE Higher National Certificate may soon be treated as a qualification for a higher technician and not for a professional engineer with the result that the Institution of Mechanical Engineers will have to reconsider its attitude to the certificate.

This important development was considered by Professor E. Griffen in his James Clayton lecture on "Reflections on the institution's Role in Engineering Education".

Professor Griffen is head of the Department of Mechanical Engineering at Queen Mary College, London, and a former member of the Education Committee of the I. Mech. E.

There will be some courses that have been of immense value to the individual and others that were a comparative waste of time. Since mechanical engineering covers such a variety of work the need of the individual varies correspondingly; thus the problem of devising a generalised course at a national level to satisfy every form of engineer is impossible, and the task of improving the course is thrown back on to the teacher.

To achieve this the teacher must be in step with current changes in simplified approaches to fundamental subjects; and he must also be in close contact with the local environment in which the professional engineer plies his trade. At this point the Institutions can play a vital role.

Practical approach

An Institution's system of examinations can influence education through its requirements for membership, although it may be argued that a required standard can be set and attained without an Institution examination, as is the case in the United States.

The Institution of Mechanical Engineers first introduced its own examination in 1912, and a scrutiny of the syllabi and the examination papers shows that, in general, the Institution syllabi were more practical and in some cases more comprehensive than a university degree course, but there was less emphasis on fundamentals and the number of subjects covered was considerably fewer.

The range of subjects covered in the Institution examination could be covered by an evening course extending over a period of about five years. At this period the number of subjects required at the final stage was two compared with five for a pass degree or six for honours required by the University of London.

Throughout the years the requirements of both the Institution and the Universities have changed, and the accompanying table shows the examination requirements for both bodies in 1961. The main changes for the Institution are a wider range of subjects and more emphasis on fundamentals. In the degree course there is virtually an extension to the course of one year.

The Institution requirements for studentship are less than those for entry to the University course; and similarly for the Part I examinations. The scope and content of the Institution Part II examination are to be compared with the University Part II and Part III examination together, and again the requirements are much less. A scrutiny of the syllabi and examination papers suggest that the Institution Part II examination is at approximately the same level as the University Part II examination, but with four subjects instead of six.

Institution	London, B.Sc. (Eng.)
Studentship Requirements Ordinary level, G.C.E. (or equivalents) in: English Mathematics Two approved science subjects *or* one approved science subject and one approved foreign language	*Entry Requirements* Advanced level, G.C.E. in Pure and Applied Mathematics Physics Ordinary level, G.C.E. in Chemistry and not less than two other approved subjects
Part I—6 subjects English Mathematics Applied Mechanics Engineering Drawing Heat, Light and Sound Principles of Electricity	*Part I*—7 subjects Mathematics Materials and Structures Mechanics of Machines Engineering Drawing Mechanics of Fluids Applied Heat Applied Electricity
Part II—4 subjects in all A. *Two* compulsory papers Theory of Machines Properties and Strength of Materials B. *One* or *two* subjects from: Applied Thermodynamics Mechanics of Fluids Electrotechnology Metallurgy Theory of Structures Work Study Principles of Engineering Production C. *One* paper if only *one* taken from B This section contains a list of fifteen specialist subjects	*Part II*—6 subjects Mathematics Strength of Materials Mechanics of Machines Applied Thermodynamics Mechanics of Fluids *and one of the following:* Electrical Engineering Theory of Structures Surveying
Part III—2 papers Industrial Administration A Industrial Administration B	*Part III*—5 subjects Strength of Materials Mechanics of Machines Applied Thermodynamics *and two of the following:* Mechanics of Fluids (Subsidiary Level) Electrical Power and Machines (at Part II) Electrical Engineering (at Part II) Theory of Structures (at Part II) Surveying (at Part II) Mathematics

Present examination requirements.

Thus in spite of the advances in requirement over the years, the Institution still demands much less than the degree course. Professor Griffen felt that in any subsequent review of the Institution's requirements it would be better to increase the number of subjects than extend the existing syllabi.

When the new examination was introduced in 1913 the working conditions of the time (a 54-hour week, and rising at 5 a.m. to start work at 6 a.m.) were not conducive to prolonged evening study, and there was little organised release of apprentices to attend day classes. However after the 1914-18 war, with a change to a 48-hour week, industry began to recognise the value of improved technical training.

At this stage certain colleges offered certificates in a number of engineering subjects, but these had only a local currency, and there was no way for teachers and prospective employees to judge how these compared with other areas.

Conditions were right for a major development in engineering education and this was initiated by the co-operation of the Institution with the Board of Education in introducing the National Certificates and National Diplomas in Engineering in the early twenties.

Certificate courses

In 1923 Higher National Certificates and Diplomas were accepted as exempting, on a subject for subject basis, from the Associate Membership examination.

In some respects the National Certificate scheme has been almost too successful, and the popularity of the Ordinary National Certificate courses has been so high that they have been greatly oversubscribed.

Through the lack of effective selection, too many unsuitable students have been allowed to start on these courses. Many do not complete the first year, and many more fail the first year examination.

This is not only wasteful of teaching facilities and teachers' time, but has deflected some students from courses which would have been more appropriate for them, and in which they would have been more successful.

The problem has been recognised for some time and new proposals now being considered by the Ministry of Education, the technical colleges and the professional bodies should ensure that fewer mistakes of this kind occur in future.

Older apprentices

Since the last war the main change in the field of education has been the great improvement in the opportunities for intelligent boys and girls to stay longer at school and to reach a level equivalent to that required for University entrance.

In future it will become increasingly unlikely that promising boys will leave school at 16 and start apprenticeships in engineering. This will reduce the number of good potential H.N.C. students, and they will now tend to stay at school until 18 and take a university degree in engineering or a Diploma in Technology.

This trend in education has been recognised in industry, where a larger number of young engineers are being taken in at 18 as apprentices for Diploma of Technology courses or at 21 as graduates.

Professor Griffen feels that the Institution will have to reconsider its attitude to H.N.C. which may soon be treated as a qualification for a higher technician and not for a professional engineer. This is already happening in electrical engineering.

The responsibility of the Institutions in constantly keeping their syllabi under review is of extreme importance. It is difficult for an examining body that is not a teaching body to be in constant direct contact with the latest educational trends, and it is inevitable that its syllabi will influence the contents of many courses.

Generally it may be said that all engineering professional bodies influence education to the extent they demand proof of certain standards of education from applicants for membership.

In most cases they prefer the educational bodies to assess the educational qualifications; that is, they prefer to accept the diplomas of certain colleges and universities as evidence of satisfactory education, instead of organising their own examinations.

But if membership is restricted to those who have followed a particular path of education what will happen to those who have been less fortunate but can still make worthy engineers? Special provisions must be made.

An examination is at present being made by the Institutions of Civil, Mechanical and Electrical Engineers to see how our methods of membership selection compare with those of various countries on the continent, and what can be learnt from them.

LECTURE COURSE ON FATIGUE

A course on "Fatigue of Metals and other Materials" is to be given at Northampton College of Advanced Technology on Tuesday evenings starting on 16th January, 1962 and lasting for ten weeks.

The course is intended for engineers and metallurgists of degree, Higher National Certificate or equivalent standard. It will deal with the following topics: basic aspects of fatigue; fatigue testing and interpretation of results including statistical aspects; cumulative damage; the effects of mean stress and state of stress; notches and cracks; effects of surface finish and treatment, temperature and environment; and fatigue in various structures.

There will also be a course on "Modern Metallographic Techniques" on Wednesday afternoons starting on 17th January, 1962, consisting of seven lectures and five practical periods. The syllabus will include theoretical and practical work on: thin film preparation; recent developments in polishing and etching; special methods of illustration in microscopy; micro-hardness testing; electron microscopy; microradiography; and surface topography.

Apprenticeships in shipbuilding

THE latest booklet published by the Central Youth Employment Executive in the series "Choice of Careers" investigates the shipbuilding and ship repairing industry. The booklets in this series are written primarily for boys and girls leaving school, but they are also of interest to those concerned with the careers of young people.

Each booklet describes the main features and practices of a profession, industry or craft and gives information about methods of recruitment and training, conditions of employment, facilities for further education, and the prospects before the young worker.

Promotion prospects

After describing the various stages of construction of a ship, and illustrating the types of jobs that are available, a broad outline of the apprenticeship schemes and the possibilities of promotion are given.

Boys who want to become shipbuilding tradesmen must serve an apprenticeship which normally runs for five years beginning at the age of 16, but most enter the shipyard at 15, when introductory training is given. It also gives an opportunity for the boy to examine from the inside whether the trade appeals to him.

Only in special circumstances will trade apprentices be accepted up to the age of 18, but if they make good progress they may serve a shorter period of apprenticeship.

The Shipbuilding and Employers' Federation and the Confederation of Shipbuilding and Engineering Unions have a nationally agreed scheme for recruitment and training which seeks to ensure that every apprentice receives thorough training and experience in all the work of his trade.

Management training

In addition to the craft apprentice schemes, older school-leavers and university graduates may train for some of the higher posts in design and management.

The Shipbuilding Employers Federation has a special five year apprenticeship scheme, or three for university graduates, which takes candidates through a university or technical college sandwich training scheme to a professional qualification in naval architecture and to posts in shipbuilding management.

Minimum age of entry is 17½ and candidates are expected to have reached at least technical college or university entrance level. In this case, the apprenticeship is to the shipbuilding industry rather than to any one firm: it is not until the end of the course that the student will become the direct concern of a particular firm.

The Royal Dockyards have their own form of recruitment where three types of apprenticeship are offered—student, craft and junior—on ship construction at Portsmouth, Chatham, Devonport and Rosyth.

Student entry

The student grade trains boys from the start for drawing office and technical officer posts; the craft apprentices cover trades as shipwrights, shipfitter, patternmaker, coppersmith etc.; and the junior apprenticeships are for caulkers, drillers, machinists, riveters and welders.

Each dockyard has its own Technical College, which craft and student apprentices attend as an essential part of their training.

For junior trade apprentices, academic training is not so essential, and all training is given on the job. However, they are encouraged to attend evening classes.

Entry to student apprenticeship between 16 and 18 is by competitive examinations held at the dockyard three times a year. One third of these vacancies are reserved for selected craft apprentices.

For the immediate future the biggest demand is for boys to enter as apprentice platers, welders and shipwrights, although there are still openings in the numerous other sections.

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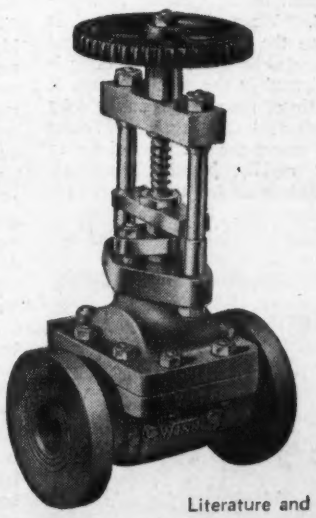

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NEW Equipment

Hydraulic broacher has 48 in. stroke

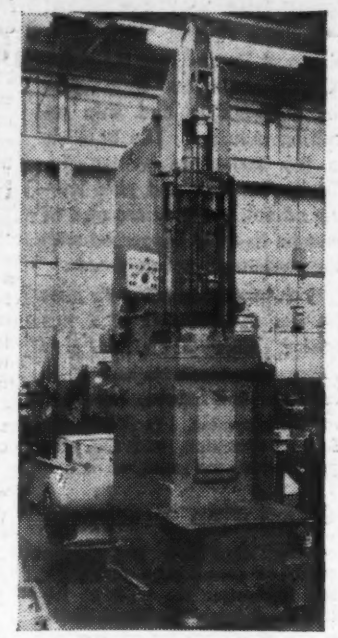
THE Matrix model TR-15-48 broaching machine has a capacity of 15 tons and a maximum stroke length of 48in. Tooled for the broaching of internal cam forms in high speed steel blanks, broaching two components per pass at a speed of 4ft./min., production is approximately 90 parts per hour.

This machine will be used for hand loading and unloading but the design is such that it can be readily converted to a fully automatic machine for the transfer line operation.

The broach is screened by a steel mesh safety gate which affords the operator complete protection and the electrical circuit is so arranged that the machine will not function until the gate is secured.

Manual advancement of the retractable table to the broaching position initiates the machine cycle. The ram automatically stops at the end of its downstroke at which stage the operator retracts the table for unloading the broached components and reloading two blanks. Table retraction triggers the circuit for the upstroke of the ram, and when this stroke has been completed and the retriever has carried the broach to its topmost position, the operator advances the table to start the next cycle. **Rockwell Machine Tool Co., Ltd., Welsh Harp, Edgware Road, London, N.W.2.**

Reader service reference No. 388



HYDRAULIC BROACHER
90 parts per hour

Electronic control

The Craven flameproof level and temperature control equipment consists of two units: a probe with a flameproof terminal chamber which is fitted into the hydraulic reservoir, and the control unit, also flameproof, which may be remotely mounted.

Both temperature and level are sensed by similar detectors housed in the probe tip. These are temperature sensitive resistors connected in a.c. bridge networks. For temperature control, the bridge is arranged to be in balance at the trip temperature level. The bridge output signal is then an alternating voltage which, when the temperature is below the trip point, is in phase with the bridge energising supply and 180 degrees out of phase above the trip point.

The level detector is similar except that the sensing resistor has a small heater winding incorporated. When the liquid level is above the tip of the probe, heat generated by the heater winding is dissipated in the tank contents. If the tip of the probe is exposed by a fall in liquid level, the heater coil causes the sensing resistor to heat rapidly, creating the same conditions as for the temperature sensing unit. In both cases, a transistor circuit detects the phase change, which is instantaneous at the trip point, and an external function such as a relay is operated.

All circuits are designed to fail safe in the event of breakdown or failure of any component and a test circuit enables the correct operation of the circuit to be checked. **Craven Electronics Ltd., Victoria Works, Bingley, Yorkshire.**

Reader service reference No. 389

Storage tray

Additional to the Randalrak range of storage equipment is the 2in. deep by 18in. by 9in. metal tray. Designed for easy portability by Randalrak or hand, the curved lip on which the tray hangs in the rack also serves as a handle.

By use of the standard plastic containers the tray can be subdivided to give 24 separate containers. Standard racks give from one to five bays with heights of 34in., 53in. and 72in. with a depth of 20½in. **James H. Randall & Son Ltd., Paddington Green Works, London, W.2.**

Reader service reference No. 390

Drum mixer

Accepting standard drums 16in. diameter by 20in. long or 24in. diameter by 33in. long, the new Manesty drum mixer has special removable paddles which can be used with either size of drum. If required, stainless steel or galvanised steel drums and paddles can be supplied.

The drive to the rubber tyred rollers is by a reduction gear unit driven by a ¾ h.p. flange mounted motor through a single chain drive. Self-lubricating plummer blocks are employed. **Manesty Machines Ltd., Speke, Liverpool 24.**

Reader service reference No. 391

Cable handling unit

The Metool cable chain system is intended to fulfil a requirement for handling trailing cables and hoses in cases where a multiplicity of electrical conductors, or hoses, are connected to travelling machinery. With this system, the conductors and hoses are fixed to a moveable carriage, a terminal box fixed to the moving machine and carriage chains conveys the power, and the incoming supply is fed via a fixed terminal box centrally mounted on the equipment.

The cable chain consists of two roller chains connected at 6in. pitches by cast aluminium spacers or cleats and the flexible elements lie in holes in these spacers. The flexibles are divided equally and one half is passed around the chain one way and half round the other, keeping the width of the equipment to a minimum. Movement is imparted to the system by the travelling machine to which power is being fed. The carriage runs on ball-bearing mounted flange wheels running in standard channel section track and the upper part of the chain is supported by jockey wheels or skids.

In use, the flexibles are subjected to no tension, pressure, friction or other detrimental forces and the bending which occurs merely falls within the makers' recommendations. There is virtually no limit to the length of travel or the number and size of flexibles to be handled and equipment can be readily designed to meet special requirements. **Metropolitan Tool & Products Ltd., 21 Victoria Street, Nottingham.**

Reader service reference No. 392

Marine gearboxes

These marine gearboxes, types MR and MRF250 and 350, are of unit construction, are based in principle on an oil-operated design and are fitted with multiplate clutches for both ahead and astern drive. A separate piston operated brake pad operating on the running gear ensures that the propellor is stationary when neutral is selected.

Should the hydraulic system fail, an emergency lock-up device enables the Ahead drive to be locked in the engaged position thus enabling the vessel to proceed.

Oil for clutch operation is supplied via an internally mounted spur gear pump and after use it is returned to the sump for recirculation. An oil filter is incorporated in the circuit and an external oil cooler can be mounted on the gearbox if required.

Single lever operation of both gearbox and throttle can be achieved by the fitting of a "Sequent Control" which is available as an optional extra. **Self-Changing Gears Ltd., Lythalls Lane, Coventry.**

Reader service reference No. 393

Shift truck unit

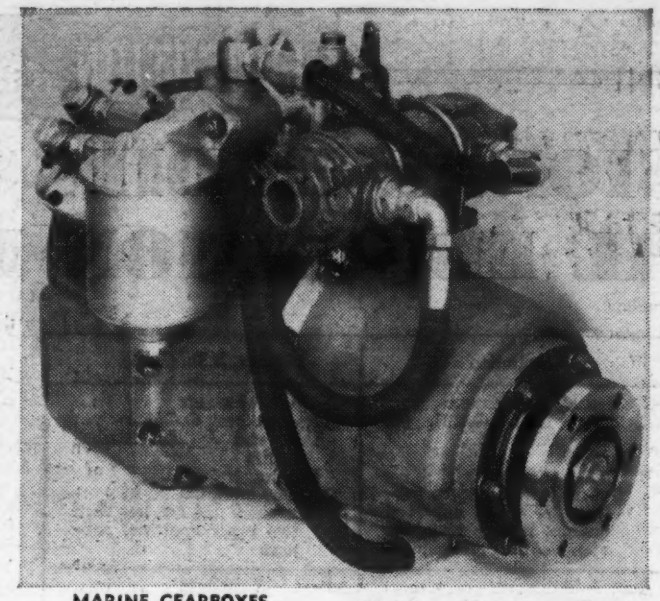
For handling heavy machine components, billets and pallet trays of small components in the machine shop, alongside assembly lines and in stores, the Polymathic Coolie hydraulic lift truck with a full capacity load of 10 cwt. at the maximum clearance height of 4ft. 6in. can be easily manoeuvered by one man.

The hydraulic pump is completely self-contained and without external feed piping, and is guaranteed for two years. Loads are raised by operation of the hand lift lever and a foot-operated variable speed release controls lowering.

Three attachments are available: fork lift arms, a steel platform and a jib arm. Because of overhang, the load on the jib arm is limited to 3 cwt. A safety valve is provided to protect the pump unit by preventing operation with loads above maximum capacity.

Adaption for particular applications can be carried out with the range of pumps, wheels and allied parts which can be incorporated. **The Polymathic Engineering Co., Ltd., Tamworth, Staffs.**

Reader service reference No. 394



MARINE GEARBOXES
Oil operated

Gear units

Parvalux types S.D.29 and 31 worm and multi spur reduction gear units have motive power supplied by two of their standard range of fractional horsepower motors of the capacitor or induction type.

These units, designed for long life with freedom from maintenance problems, have a fully oil-sealed gearbox, filled with the appropriate grade of oil before despatch.

Suitable for many industrial applications, units for all a.c. voltages can be supplied. The final shaft can be supplied in four alternative positions. **Parvalux Electric Motors Ltd., Wallisdown Road, Bournemouth.**

Reader service reference No. 395

Hydraulic system

Developed for producing pulsating loads, the Torvac self-contained hydraulic system is used for slow cycle fatigue testing of structures. Pressure available is up to 1,500lb./sq. in. and cycle rates are up to 1 in every 3 secs.

It consists of a hydraulic pump whose rate of delivery into a ram can be varied from zero to maximum and which will operate between preset pressure levels. In action it produces a pressure wave which rises or falls at a preset rate and has a flat top or bottom. It is held at the preset upper and lower levels by an adjustable timer and will continue to cycle automatically and to record the number of cycles until the structure either breaks or deforms beyond a certain limit.

Applications include testing of bridge elements, pylons, concrete beams, automobile components, road surfaces and many other engineering components and structures. **Torvac Ltd., Histon, Cambridge.**

Reader service reference No. 396

Bending machines

Now available in the U.K., the Bochumer range of eight section bending machines are supplied with rollers suitable for use on angle iron, channels, T-sections, flat and square bars.

With the exception of the smallest model, all machines are of the horizontal type with maximum capacities ranging from 2in. by 2in. by 3/8in. up to 8in. by 8in. by 7/8in. angles or sections with equivalent modull. **The Argall Machine Tool Co. Ltd., 162 Buckingham Palace Road, London, S.W.1.**

Reader service reference No. 397

NEW Materials

Lapping discs for diamond compounds

A SELF-ADHESIVE chemico-textile polishing disc, known as HYProcel has been introduced which is claimed to have unusual abrasive and lubricant holding power and can be accurately flat or moulded to curved lapping heads. It is for diamond and other abrasive compounds used in the lapping or polishing of soft, hard and very hard materials.

Its introduction represents a major advance over angora wool, silk, rayon, cashmere and felt lapping cloths, since all these materials have a nap whose irregularites make an optically flat finish very hard to obtain. They also have the difficulty of being hard to clamp securely over lapping plates leading to rolled edge effects on the workpiece.

The material is coated with a pressure sensitive adhesive layer which is protected by backing paper. The total thickness is controlled to within a few thousandths of an inch. When applied to an optically flat lapping plate, the flatness is transmitted through the disc and hence high degrees of flatness with mirror finishes to one light band can be obtained.

The foam/fabric material of which the disc is composed can be softened in certain solvents, such as acetone, and the disc can then be moulded to shaped lapping heads for particular applications. Alternatively the discs can be segmented for fitting to the contours of high curvature and irregular shaped tools.

Improved flatness and high reflectivity with a 50 per cent or greater saving in time are claimed to have been achieved but it is emphasised that the special qualities of this material will only be fully appreciated when the discs are used with a high grade of diamond compound. **Englis Ltd., Maidstone, Kent.**

Reader service reference No. 400

LAPPING DISCS
Give mirror finish

NEW Publications

The story of their development and progress is told and illustrated in a new publication called **Distillers Plastics Group.** The text and illustrations show how the organisation is prepared to meet the promised widening of trade in the Common Market.

Sections cover: plastics materials and manufacture, which deals with the various companies, their products and organisation within the group; research and development, covering the laboratories where new materials and techniques are investigated; markets and services, dealing with uses and services available; applications of plastics and the various countries served by the group. **Distillers Plastics Group, Devonshire House, Piccadilly, London, W.1.**

Reader service reference No. 398

An Outline History of the Oil Engine and its Lubrication, a book published by Shell-Mex and B.P. Ltd., covers the period from 1860 to the present day. Chapters are devoted to engine design, split up into different periods and lubrication, similarly split up. A final chapter deals with the various lubricants available from Shell for industrial and marine oil engines. The principle ranges of these lubricants are named after seashells and information is also given concerning the shells after which they are named.

Reader service reference No. 399

Turn to page 15 for Classified Advertisements and read about . . .

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December 21, 1961

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ENGINEERING CONTRACTS

£1·5m. PRINTING PRESS ORDERS

ORDERS for more than £1,5 million worth of newspaper and magazine rotary printing presses have been received by Miehle-Goss-Dexter, a division of the Goss company. Among these contracts is a repeat order from France-Soir.

☆

High capacity ore wagon handling and unloading equipment for Port Elizabeth, South Africa, is to be produced by the Bristol engineering firm, Strachan and Henshaw. The plant, worth more than £136,000, will unload ore at some 1,500 tons an hour.

Steelworks control

Brookhirst Igranic are to produce control equipment for two steelworks in Europe. Brookhirst will produce crane controls for Netherlands Kabelfabrieken NV, near Rotherdam, Holland.

The second order is for 64 electromagnetic brakes for a new plant for the Metallurgique d'Esperance-Londoz Company at Liege, Belgium.

Harland Engineering have ordered from Brookhirst a switchboard for a paper mill in the U.S.S.R. Brookhirst Igranic is a company in the Metal Industries group.

£1m. Dragline

A Ransomes and Rapier W1800 giant walking dragline has been ordered by an Italian company to be used for stripping the surface from lignite coal deposits in Potenza province.

Representatives of the company Societa Meridonale di Elettricitia, were able to see the £905,500 walking dragline used by the Coal Board in open-cast workings in South Wales, the biggest of its type in Europe, before placing their order. With spares the contract will be worth almost £1 million.

☆

George Kent, of Luton, Bedfordshire have received what is thought to be the largest order for instrumentation equipment yet placed in Britain. It is for the new Drakelow C power station in Derbyshire.

More than £500,000 of instrumentation and fully automatic control equipment will be supplied to the instructions of the Midland Project Group of the Central Electricity Generating Board, of the boiler makers, John Thompson Water Tube Boilers, of Wolverhampton, and the English Electric Company, who are installing two 350MW boiler turbine units.

FINANCE AND COMMERCE

STEEL OUTPUT IMPROVES

Stock withdrawals affect production figures

STEEL production rose slightly in November bringing utilisation of the steel industry's capacity up to 79 per cent. Iron and Steel Board figures show that steel output for the month was averaging 420,000 tons a week, a 5 per cent improvement on the September performance, although still 17 per cent down on November, 1960.

In the first eleven months of 1961 the steel industry was producing at an annual rate of 22.4 million tons. The expected seasonal decline in December's output may bring this down to 22.25 million tons.

This disappointing result (an output of 24-25 million tons had been expected for the year) was largely brought about by the large stock withdrawals which began in early summer and have continued.

Home use is only a little down on the estimates for the second half of the year. Exports are being kept up and may better last year's 4.08 million tons.

The industry's exports are now taking a slightly greater share of the world's export market. Against intense competition and with total world steel exports in the first half of 1961 slightly less than the first half of 1960, the U.K. share of world exports increased from 15 to 17 per cent.

Users' and merchants' steel stocks are now known to have been cut by 216,000 tons (4.7 per cent) during the third quarter of the year. Stocks of sheet fell the most by 7.72 per cent. This was not at the same sharp rate of stock reductions in sheet as were being carried out in the first six months of the year.

Producers' stocks were reduced by 120,000 tons in the third quarter. Taken together, stocks held by merchants, users, and producers were cut by 336,000 tons, or 460,000 tons ingot equivalent. In 1960's third quarter there was a rise in these stocks by 700,000 tons ingot equivalent.

Producers' stocks have continued falling in the fourth quarter.

TRADE AGREEMENTS

CABLE Co. MERGES BRANCHES

FROM the start of the New Year Johnson and Phillips, of Charlton, London S.E.7 will be operating with a new home sales department.

The system will function through two organisations, one handling cables and junction boxes, the other switchgear, transformers, and capacitors.

Certain of the company's old branch areas have been merged for more efficient working in the new cable sales organisation. The number of cable stores will not be reduced.

☆

Two machine tool manufacturing companies, Frederick Town and Sons, of Halifax, and Woodhouse and Mitchell, of Brighouse, members of the Thomas W. Ward group, have been merged under the name Town Woodhouse Ltd.

This is to further the bringing together of the group's machine tool production interests. Manufacture will continue at the separate works, under a centralised works control, planning and administration.

EEC firms fear British trade challenge

MANY Continental firms are expecting fierce competition in their home markets from British manufacturers if, as expected, Britain enters the Common Market.

Returning from a tour of French and German industrial centres, Mr. Adam Johnstone, chairman of Sales Audits Ltd., said: "There is also some apprehension over the activities of the large United Kingdom companies who are buying into Continental markets well ahead of 6-Day."

Particularly among the smaller firms in France and Germany fear of British competition is evident. Mr. Johnstone found that British quality and production knowledge is widely acknowledged.

In Germany over-employment is leading to lengthy order books and delays in delivery. In France the first signs of wage-push inflation have appeared and rises in costs and prices are now evident following an increase in wages of almost 10 per cent.

Price rises

Looking ahead Mr. Johnstone forecast that shortage of labour, and additional union wage claims (wage levels are 11 per cent up on the same period last year) will shortly affect German prices.

First-class opportunities, he suggests, are to be found in textiles, chemicals, in engineering and in electronics.

Engineering News asked Sales Audits what were the particular opportunities in West Germany for British engineering exports.

The answer depends in part on the German regard for the special ability of companies in the U.K. to handle the one-off job, to produce to consistently high standards and to deal with orders for machines where considerable adaptation from the standard version is required. The strength of German industry is seen as lying in those products for which a production line can be laid down.

In machine tools the lengthening West German order books and the growing cost and shortage of labour, which leads to even greater demand for automatic or semi-automatic equipment, is reported to have created a situation where the market is wide open for the company which engages in vigorous marketing and well-organised after-sales service.

FROM MANCHESTER TO MEXICO

Assembly stage of one of three 33MW steam turbines which Associated Electrical Industries are supplying to Ciudad Delicias, Mexico, from their Trafford Park, Manchester, works. The power station, which is being built as part of a five-year plan of the Federal Electricity Commission is being supplied complete by AEI at a cost of £3¼ million. The oil-fired boiler plant will be by Babcock and Wilcox.

Export opportunities

TURKEY: Tile Manufacturing Plant. Project under consideration for a loan of $15,000 from the United States Development Loan Fund. Machinery required is: One automatic tile forming press, capacity 25,000 tiles per day, motor 4 h.p., six dies type, complete with electrical and mechanical equipment; One elevator for charging bricks and tiles into drying furnace, complete with electrical devices; Fans for warm and cold air circulation, complete units for drying furnaces in tile and brick manufacturing plants.

The applicant for the loan is Giresun Tugla ve Kiremit Fabrikasi A.S., Sultanselim Mahallesi Ak Sokak No. 33A, Giresun, Turkey. Suppliers are advised to communicate immediately with the buyer. ESB 37687/61/D.L.F.

AUSTRALIA: Dredger. Ports and Harbours Department, Victoria Government, have invited tenders for a dredger, twin screw trailing and cutter suction hopper, including design and construction. Tenders close on May 29, 1962. Specification and Tender documents have been sent to the Agent General for Victoria in London. ESB 37205/61.

Switchgear. Twelve items of 6,600-11,000 volt metalclad switchgear and accessories. Bids should be sent to the Secretary, State Electricity Commission of Victoria, 22-32 William Street, Melbourne, C.1, quoting Tender to Specification No. 61/62/180. Closing date January 8, 1962. Insulators. A call for tenders No. 61/62, has been issued by the Secretary, The Cairns Regional Electricity Board, Box 358 PO, Cairns, North Queensland, for the supply of 6,000 disc insulators and 1,200 guy insulators. Closing date January 9, 1962. ESB 37505/61.

Inquiries should go to the Export Services Branch, Board of Trade, Lacon House, Theobalds Road, W.C.1, before dates given. References (ESB) should be quoted.

GROWING INDUSTRIES HUNGRY FOR CREDIT

THE Pacific coast states of the USA have developed so swiftly in the last 15 years that lessons from their experience and predictions on their future are worth study. The chief "operating officer" of a United States financial organisation based on Los Angeles has declared that in 1962 the expanding industries of the area will acquire "a voracious appetite for credit".

Manufacturers listed as seeking substantially greater amounts of credit are those making electronic and communications equipment, metal products, plumbing and air-conditioning supplies, rubber products, plastics, toys and many others.

British companies prevented from growing, or accepting worthwhile contracts by the low availability of money and the high rate of interest, may note the exuberant air with which this organisation declares that it has unlimited funds at its disposal for West coast firms able to use them in a sound and constructive manner.

Competitive pressures to employ working capital to the greatest efficiency are likely to be so fierce that many firms will need outside finance to achieve a sufficiently swift turnover of working capital.

NEW Companies

Avondale Metal Co. Ltd., The Poplars, Normanton Spring Road, Woodhouse, Sheffield. To take over the business of iron and steel and metal merchants and stockholder carried on by Raymond D. Meredith as "Avondale Metal Company" at Woodhouse, Sheffield and at Renishaw Sidings, etc. Nominal capital £20,000.

Godstone Precision Engineering Co. Ltd., 15 High Street, Leatherhead. Nominal capital £100.

Neal Components Ltd., 27 Cannon Close, Coventry. To carry on the business of designers, manufacturers and repairers of machine tools, etc. Nominal capital £1,000.

Victor Goodyer (Tools and Fixtures) Ltd. To carry on the business of manufacturers and merchants agents, etc. Registered by solicitors, Elliott and Slater, 12 Paradise Square, Sheffield.

Lloyd Register & Grille Co. Ltd. To carry on the business of heating, ventilating, air-conditioning and building engineers, etc. Nominal capital £100. Registered by solicitors, Freshfields, E.C.2.

These particulars are selected from the daily Jordan's Register, published by Jordan & Sons Ltd., 116 Chancery Lane, London, W.C.2.

STOCK MARKET DEVELOPS FIRMER TENDENCY

WEEK IN THE CITY

BY OUR CITY EDITOR

MOST sections of the London stock market developed a firmer tendency last week, though the investment background has shown no fundamental change.

Shipbuilding shares have been helped by reports of an increased flow of orders to British yards. Swan Hunter being a good feature. The chairman's cautionary remarks about current trading at the annual meeting caused a reaction in Birmingham Small Arms.

Steel shares, steadied by the John Summers results, were unsettled by the Steel Company of Wales dividend cut. Having held the interim payment at 5 per cent, the SCOW board are cutting the final from 7½ to 5 per cent, and the total is thus reduced from 12½ to 10 per cent.

Although gross income, at £133 million, was only moderately lower, SCOW's trading profits are down by about 24 per cent, and earnings for the Ordinary capital are down from 41 to about 28 per cent. Without the benefit of investment allowances they would have been as low as 19 per cent.

The Stewarts & Lloyds results were much as expected, with total profits down by about 14½ per cent, despite an increase in sales, and the dividend maintained at 15 per cent, the 10 per cent final being payable on capital as increased by a two-for-nine rights issue. No further issue of permanent capital is expected in the near future.

The main factor bearing on steel company results this year has been the narrowing of margins caused by rising costs.

Among forthcoming capital-raising operations is a one-for-twelve rights issue by Skefco Ball Bearing, to raise about £1.6 million.

The intention is to issue the new shares at 65s. each, against the recent market price of about 81s., and consent is being sought for the Swedish parent company to participate.

BIGGER STORES

THE Paris subsidiary of the Pollard Ball and Roller Bearing Co., of Knottingley, Yorkshire, have bought additional warehouse facilities, of 2,500 sq. ft. floor space, close to the office and showrooms of the subsidiary, Pollard Roulements, at 6 Boulevard Pershing, Paris 17e.

Renault to build U.S. compacts

COMPETITION in the European car market is to be intensified by the entry of the Rambler cars of the American Motors Corporation. The United States concern have completed an agreement with the French Regie Renault for the assembly and partial manufacture of Rambler cars at the Renault plant in Haren, a suburb of Brussels, Belgium.

At first Renault will build only the Rambler Classic, with certain modifications for the European market. Later a range of models will be produced.

No change is intended in the United States operations of Renault, the second largest exporters of small cars to the USA.

MORE OIL USED IN SCOTLAND

FINANCE AND COMMERCE

CRITTALL OPENS MALAY BRANCH

PRODUCTION of Crittall standard metal windows in a new Malayan factory will be under way before the end of the month.

Crittall (Malaya) Ltd., a new company, has been formed. The local organisation will also assemble purpose-made aluminium windows and curtain walling made in Britain. The parent company have a long connection with Malaya and Singapore, selling there for 50 years and supplying steel windows for most large building developments in the post-war years.

The works is on Malaya's first industrial estate at Petaling Jaya, near Kuala Lumpur, where 100 factory sites have been leased to industry since 1954. The nucleus of the labour force will be formed by experienced Malay and Chinese draughtsmen and fitters.

Figures show continued move to diesel power

OIL consumption in the first nine months of this year in Scotland was rising by 9.9 per cent over the same period of last year; for the whole of the United Kingdom the increase was 8 per cent.

Fastest advance of all is in the use of gas/diesel oil where the increase in the January to the end of September period was 2.4 per cent although the rate of increase was slightly down on earlier years.

Fuel oil consumption, excluding refinery use, was 733,731 tons, a rise of 14.6 per cent.

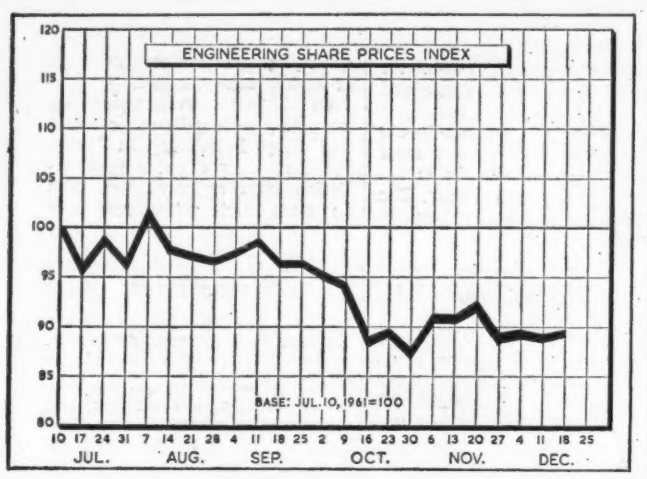
Commercial consumers used 2.8 per cent less motor spirit while deliveries to dealers were up by 9.2 per cent.

This fall in commercial use of motor spirit reflects the continuing movement to diesel powered vehicles, which brought a 7.6 per cent increase in the use of DERV (diesel engined road vehicle) fuel.

Metal Box Co. in Ireland

A PLASTICS venture which the Metal Box Co. are launching in Eire with the Irish Glass Bottle Co. is to have an issued capital of £201,000.

Production has been started in premises close to the five acre site bought at Balleyfermot, Dublin. It is intended to produce plastic packaging, including bottles, film, injection mouldings and laminations.



Pay pause 'let-down'

THE upward movement in exports which was expected to follow the imposition of the pay pause has not come about, states the National Association of British Manufacturers journal.

"An improvement is forecast with some confidence for next year, but this depends mainly upon an upward movement in the American economy and is not a consequence of the steps taken by the Government," says the Association.

Apparently fearing the sudden death of the pause, the NABM ask: "If it was right to introduce a pause at all, surely it should be maintained."

ENGINEERING NEWS SHARE PRICES TABLE

1961 High	1961 Low	Stock	Dec. 18	Ch'ge	Y'ld p.c.	1961 High	1961 Low	Stock	Dec. 18	Ch'ge	Y'ld p.c.
47/9	29/9	Allen, Edgar (£1)	29/9	...	8.9	57/-	44/9	Lister, R.A. (£1)	52/6	–1/-	5.2
43/-	24/9	Allen, W. H. (£1)	25/9	+3d.	7.6	51/9	36/-	Mather & Platt (£1)	36/3	+3d.	6.0
77/-	58/6	Angus, George (£1)	67/6	...	5.9	67/-	46/-	Metal Industries (£1)	55/-	+3/-	5.4
31/10½	19/-	A.P.V. (10/)	29/6	–1/-	3.7	71/3	53/4½	Morgan Crucible (£1)	56/9	–6d.	4.8
14/1½	8/10½	Asquith Machine Tool (5/)	10/-	+6d.	2.4	31/-	16/7½	Morris, Herbert (10/)	16/7½	...	8.2
48/6	29/-	Assoc. Electrical Ind. (£1)	28/6	–1/-	10.4	52/-	37/3	Murex (£1)	40/6	+6d.	6.3
16/5	11/8	Assoc. Engineering (5/)	13/6	–1½d.	5.0	49/6	40/6	Neepsend Steel (5/)	41/-		6.0
110/-	83/-	Averys (£1)	96/3	+1/-	3.1	31/6	20/3	Newton Chambers (5/)	19/6	–9d.	5.0
36/9	20/-	Babcock & Wilcox (£1)	21/3	+3d.	...	41/3	20/7½	Parkinson Cowan (£1)	20/7½	...	8.4
59/6	40/6	Baker Perkins (£1)	44/4½	+1½d.	5.0	72/9	47/-	Parsons, C. A. (£1)	50/9	–9d.	4.9
9/7½	5/10½	Beyer Peacock (5/)	6/7½	–1½d.	8.7	40/3	38/-	Plessey (10/)	43/9	–9d.	3.4
77/-	45/-	Birfield (£1)	68/6	+2/-	2.9	33/-	16/-	Pressed Steel (5/)	17/3	...	...
102/10½	60/6	Birmid Industries (£1)	61/6	+1/-	6.4	25/3	19/9	Qualcast (5/)	21/6	+4½d.	4.1
36/10½	18/6	Birmingham Small Arms (10/)	17/-	–1/6	6.8	38/1½	22/3	Radiation (£1)	23/3	–10½d.	8.4
45/6	33/6	Brockhouse, James (£1)	43/4½	+2/-	5.7	22/6	14/-	Ransome & Marles (5/)	15/6	+3d.	4.3
28/9	21/1½	Broom & Wade (5/)	21/4½	+3d.	5.3	28/6	22/6	Ransomes, Sims & Jeffs (£1)	24/9	...	6.0
42/6	29/9	Brotherhood, Peter (10/)	31/3	...	7.8	50/6	34/6	Renold Chains (£1)	44/9	...	4.4
48/9	30/4½	Brown, John (£1)	35/1	+1/10½	6.2	52/3	38/-	Reyrolle, A. (£1)	44/3	+2/-	4.4
8/6	4/3	Cammell Laird (5/)	4/9	+3d.	4.9	9/1½	3/4½	Richardsons Westgarth (10/)	3/9	+4½d.	...
39/6	24/3	Carrier Engineering (5/)	24/9	+6d.	5.0	9/3	4/3	Roberts, Charles (5/)	5/9	+1/6	...
54/3	35/6	Clarke Chapman (£1)	36/6	+1/-	7.4	48/6	35/6	Rolls-Royce (£1)	35/10½	+4½d.	6.1
14/9	9/6	Cohen, George (5/)	9/6	–3d.	6.5	32/6	20/-	Ruston & Hornsby (£1)	19/6	–6d.	9.0
33/10½	21/8	Coventry Gauge & Tool (10/)	31/-	...	4.6	19/3	12/3	Serck (5/)	13/3	+4½d.	4.6
12/3	7/3	Craven Brothers (5/)	8/6	+6d.	4.9	23/9	9/3	Shaw, Francis (4/)	9/3	...	...
24/-	17/6	Crofts Engineers (5/)	21/-	...	3.9	12/-	7/9	Sheepbridge Engrg. (5/)	8/6	...	8.3
39/7½	30/-	Davy-Ashmore (5/)	32/-	+1/3	4.2	32/4½	19/1½	Simms Motor (5/)	24/3	+9d.	3.5
70/-	44/3	De La Rue (10/)	51/9	+9d.	4.2	44/1½	29/7½	Simon Engineering (5/)	30/7½	–4½d.	4.4
27/7½	19/9	Delta Metal (5/)	21/-	+9d.	4.7	23/9	13/9	Smith, S. & Sons (4/)	16/3	+6d.	4.8
68/9	50/-	Desoutter (5/)	63/9	+3/9	2.7	15/3	11/-	Solar Industries (5/)	11/9	+6d.	7.3
41/3	29/6	Dowty Group (10/)	30/6	+10½d.	5.0	45/7½	22/6	Staveley Industries (£1)	27/-	+2/-	8.0
32/10½	22/4½	Edwards High Vacuum (4/)	31/7½	–3d.	1.9	32/6	18/6	Steel & Co. (5/)	31/4½	+9d.	3.5
52/-	35/3	Elec. & Musical Ind. (10/)	44/3	+3d.	3.9	67/-	38/-	Stone-Platt Ind. (£1)	43/3	+6d.	...
40/3	25/9	Elliott-Automation (5/)	43/-	+3/9	1.5	20/4½	14/-	Tecalemit (5/)	15/6	–9d.	5.7
40/6	24/-	English Electric (£1)	23/6	–6d.	8.4	17/4½	10/6	Thompson, John (5/)	12/9	+2/3	1.9
37/3	21/6	Firth Cleveland (4/)	23/4½	+1/10	5.5	7/-	4/-	Thornycroft, John (4/)	4/3	...	8.1
39/6	24/3	G.E.C. (£1)	23/3	–1/-	8.8	17/6	11/6	Toledo Woodhead (4/)	15/6	+3d.	5.1
65/-	46/3	General Refractories (10/)	47/3	+1/-	5.2	85/6	55/-	Tube Investments (£1)	62/9	+2/3	4.4
66/6	46/3	Glenfield & Kennedy (£1)	46/3	...	...	38/4½	25/6	Vickers (£1)	27/4½	+10½d.	7.2
108/7½	70/-	Guest, Keen & Nettlefold (£1)	74/9	+4/9	4.2	...	...	Walmsley (Bury) (£1)	61/9	...	3.5
48/7½	26/6	Haden, G. N. (5/)	29/9	–9d.	3.2	84/6	59/6	Ward, Thos. W. (£1)	59/-	–6d.	4.6
16/6	12/1½	Hall-Thermotank (5/)	12/6	...	4.4	17/9	10/1½	Weir, G. & J. (5/)	12/3	+3d.	7.2
24/-	13/4½	Harland & Wolff (£1)	14/3	+7½d.	6.9	47/6	27/3	Wellman Smith Owen (5/)	26/7½	–7½d.	4.0
33/3	21/6	Hawker Siddeley (£1)	22/9	+10½d	9.2	14/1½	9/9	West, Allen (5/-)	9/9	...	6.7
31/-	19/-	Head Wrightson (5/)	20/-	+1/-	3.9	46/3	23/6	Westinghouse Brake (£1)	23/-	–6d.	9.4
79/9	51/6	Herbert, Alfred (£1)	63/9	+1/3	4.3	36/6	18/-	Whessoe (5/)	18/-	...	7.4
95/6	70/-	Hick Hargreaves (£1)	70/-	...	5.8	17/-	12/-	Wilmot-Breeden (5/)	14/6	+3d.	3.9
138/9	101/3	Hopkinsons (£1)	110/7½	...	4.9	30/-	18/9	Woodall-Duckham (5/)	18/3	–6d.	5.6
25/-	18/6	Howden, James (5/)	19/3	...	6.3	64/9	44/6	Worthington-Simpson (10/)	47/6	–9d.	5.2
33/9	22/7½	International Combus (5/)	25/10½	+1/-	5.7						
		IRON AND STEEL									
43/6	25/7½	Brown Bayley (10/)	37/6	...	4.2	42/-	22/7½	South Durham Steel (£1)	22/4½	–9d.	9.0
81/3	49/-	Colvilles (£1)	46/7½	–3/6	7.0	47/8¼	30/1½	Steel Co. of Wales (£1)	29/3	–10½d.	6.9
32/3	17/1½	Consett Iron (£1)	17/7½	+6d.	...	57/4½	36/7½	Stewarts & Lloyds (£1)	36/10½	–6d.	8.3
43/7½	23/4½	Dorman Long (£1)	23/4½	...	8.7	68/7½	42/1½	John Summers (£1)	43/10½	+9d.	6.9
55/1½	37/-	Firth & Brown (£1)	44/-	+3d.	5.7	55/7½	38/-	United Steel Cos. (£1)	38/10½	–3d.	6.3
49/10½	31/1½	Lancashire Steel (£1)	31/3	–1/3	6.9	63/6	46/-	Whitehead Iron & Steel (£1)	41/9	–3/3	6.9

The companies whose share prices are quoted in the Engineering table and which form the basis of the Index give a balanced and comprehensive study of the engineering industry. Prices quoted are those at the start of the week. Due adjustments for Rights and Scrip issues are made. The Index figure is calculated on a National Cash Register Company computer. Prices in the Iron and Steel sections are not included in the Index.

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Write to the Managing Director giving brief details of experience and qualifications.

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Staff Officer (DE.46)
Employment Department
Fort Dunlop
Erdington, Birmingham, 24

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Chief Production Engineer

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The time has come for all these functions to be co-ordinated under a separate department head and so this is a new appointment attractive to a production engineer with sound experience in electrical control gear manufacture and assembly.

Substantial assistance with re-housing will be given to the successful candidate.

Applications are invited and should give details of age, qualifications and experience, quote reference EN394M and be addressed to the Director, Group Personnel Services, English Electric House, Strand, London, W.C.2.

'ENGLISH ELECTRIC'

SALES ENGINEER

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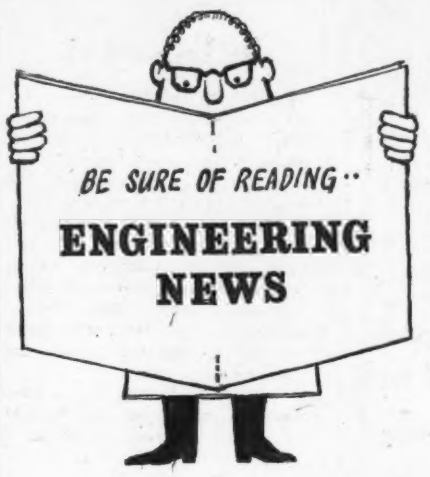

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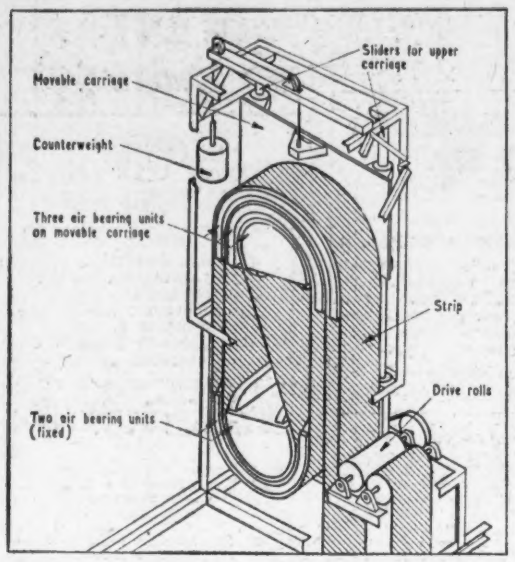
HOVER PULLEYS REPLACE ROLLERS

BISRA develops air bearing for strip steel processing lines



Labyrinth looping tower devised by BISRA for testing hover pulleys. 12in. wide thin strip is carried over five units on an air cushion approximately 0.1in. thick.

CONVENTIONAL assemblies of rollers for guiding thin steel strip through processing lines are avoided in designs incorporating hover principles developed by the British Iron and Steel Research Association.

The device, known as the Hover Pulley, was demonstrated on experimental plant last week at BISRA's Battersea laboratories and further development is being undertaken by the association in co-operation with Head Wrightson.

Hover pulleys are air bearing units formed from sheet metal or plastic. These are rectangular in section and curved in an arc of approximately 180°; each end is formed into an inlet nozzle.

Air jet slits are formed in the outer surface, inclined to the centre of the bearing surface.

Air jet through the slits forms a curtain bounding the outer surface area which contains the pressurised bearing surface and supports the strip.

From experimental data obtained BISRA say that an air supply of some 980cu.ft./min. at a pressure of 27in. water gauge would be required to support a 36in. wide thin tinplate strip under 150lb. tension. These figures apply to a single semi-circular hover pulley of 2ft. diameter.

A labyrinth looping tower using hover pulleys has been devised by BISRA. This pilot scale unit transports 12in. wide strip at high speed over five hover pulleys.

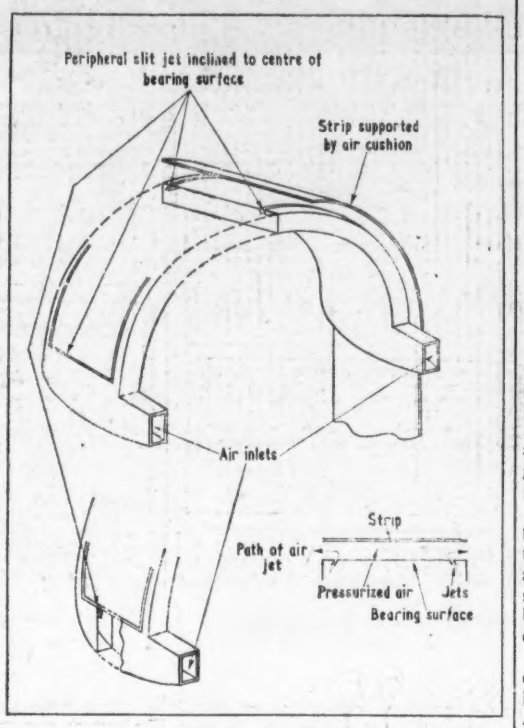
Wide use is foreseen for this development. Hover bearings can offer certain advantages over conventional roller bearings and are said to be ideal for handling ultra thin strip or foil and strip at high temperature.

Strip breakage problems are reduced because of the lower line tension possible by this method. There are, it is said, no tracking problems, and strip speed would appear to be unlimited.

Head Wrightson have been working closely with BISRA and have an exclusive licence to manufacture these bearings.

They have constructed a full-scale pilot rig incorporating four air bearings 12in. to 36in. diameter and one 18in. diameter.

The rig operates with a closed loop of strip 32in. wide and 15in. long. Strip speeds can be varied up to 2,000ft./min.



Semi-circular air bearing developed by the association and called a Hover Bearing.

NRDC BACKED 40 BRITISH PLANS

MORE than £800,000 was spent by the National Research Development Corporation on backing British inventions in the year ending June 30, 1961. The corporation's 12th Annual Report, published last week, says that in the year reviewed financial and other assistance was provided for nearly 40 development projects which includes seven new ventures.

Of the year's total expenditure £475,000 was spent on the Hovercraft, Dracone, and Fuel Cell inventions. The report shows that NRDC now holds rights in 3,400 British and overseas patents, and patent applications derived chiefly from publicly supported research in Government research establishments, the research councils, and universities.

Over 495 licence agreements with British industrial firms were in force, the highest in the corporation's history, and overseas agreements increased to 48, mostly with U.S. firms.

Private projects

Although the majority of private inventions submitted to the NRDC do not qualify for sponsorship, the report says that a significant part of the corporation's expenditure has been devoted to projects based on inventions by private individuals and firms.

Some of these are, the Cockerell Hovercraft, Bacon Fuel Cell, Fanshawe Automatic Drilling Rig, Perry Infinitely Variable Speed Gear, and Lewis Continuous Leather Processing Equipment.

3MW turbo generator for works

TO supplement their steam-turbine generating equipment English Clays Lovering Pochin and Co. are using a Bristol Siddeley 3-MW turbo generator for their china clay works in Cornwall.

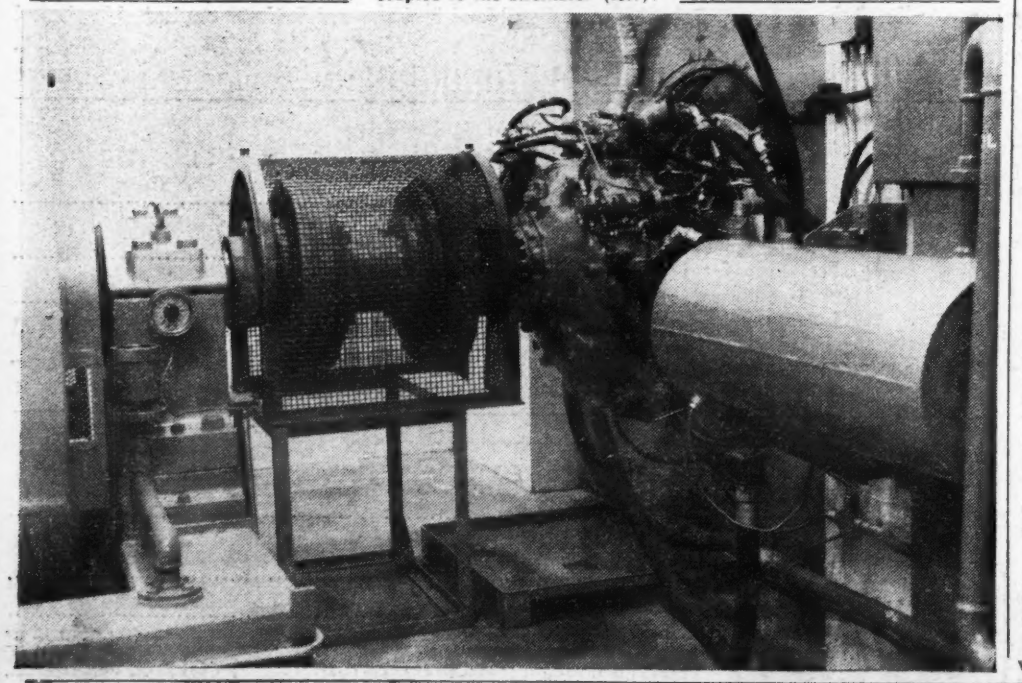
This is the first order received from private industry.

The set is sited about five miles from its controlling generating station. It provides a means of meeting peak loads for a low capital outlay.

The industrial Proteus gas turbine supplies the power. Two of the sets have been in service with the South Western Electricity Board for two years and a third is to be commissioned shortly.

Each set is capable of supplying a town of 10,000 people.

On the right can be seen the Proteus reduction gear which is coupled to the alternator (left).



THE 10,000th BOILER

A milestone was passed in the 140-year history of John Thompson (Wolverhampton) when they delivered their 10,000th shell boiler last week.

Weighing 20 tons and measuring ten feet in diameter, the boiler is to be installed in the new engineering development block of the Rolls Royce Aero Division.

DSIR contract for machine tool firm

THE first development contract to be awarded to industry by the Department of Scientific and Industrial Research has been made to the Stockport machine tool company, Craven Brothers (Manchester) Ltd., for a large gear grinding machine.

Worth about £200,000, this contract will assist in the development of a machine giving a high degree of accuracy and surface finish, handling gears up to five feet in diameter.

More accurate

Mr. James Lauchlan, chairman and managing director of Craven Brothers, told Engineering News:

"I think the most important thing about this is that we are going to produce machines which will be much more accurate than you can get now, and at an economic cost.

"Their rate of production will be faster and it will mean that designers in medium and heavy engineering will be able to design units which will be smaller, and which will operate at higher speeds and more quietly.

Fresh mechanical innovations and some of the most recent techniques evolved at the National Engineering Laboratory will be incorporated in the new machine. NEL , in collaboration with Craven Brothers, will supervise the development, acting for D.S.I.R.

Special capital

The Stockport firm will contribute towards development costs and will provide the special capital equipment necessary for the production of the machine. Their research and development team will be substantially expanded and their work should be completed in three to four years.

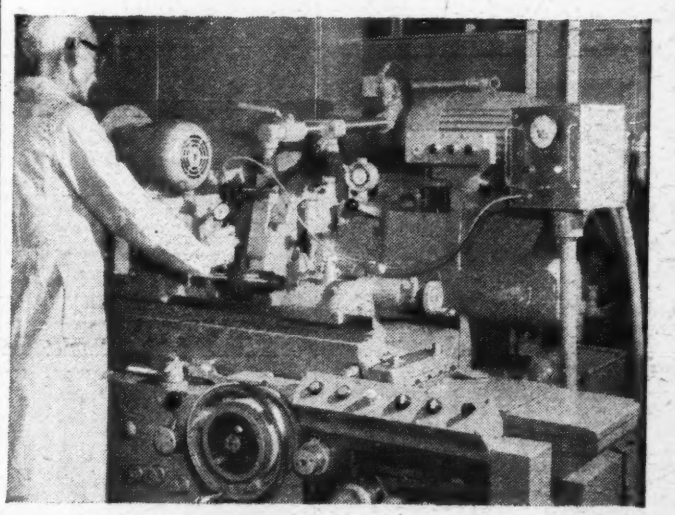
A return will be obtained on the D.S.I.R. grant, assuming that the project is successful.

Engineering News reported on November 23, the imminence of Government development contracts for industry.

Eventually, it is hoped, the work will lead to a range of fully patented machines able to grind gears up to 150in. diameter.

NEXT WEEK: Engineering News will carry the special report of its machine tool correspondent, Mr. C. Kenward, on some of the research and production activities of Craven Brothers.

FIRM WIDENS GRINDING MACHINE RANGE



Infeed grinding a multiple diameter workpiece employing Acrasize air-electric gauge sizing on a Cincinnati Filmatic machine.

CINCINATTI Milling Machines, Birmingham, have announced that their production programme is to be expanded by the building of a range of plain and universal centre-type grinding machines at the Weatherley-Cincinnati plant at Biggleswade.

Charles Churchill and Co., who have represented Cincinnati for milling, broaching, die-sinking, and cutter sharpening machines in the U.K. for some years, will also be exclusive domestic agents.

Among the machines to be manufactured in the U.K. will be the new Filmatics; the 14in. and 18in. universal grinding machines and the 10in. and 14in. plain hydraulic grinding machines.

Filmatic bearings are used for the grinding wheel spindle. These bearings consist of multiple segments fixed axially, but free to rock a slight amount.

As the spindle rotates, wedge shaped oil films are formed between the segments and spindle periphery. High pressures are built up and the segments automatically adjust themselves to variations in forces.

Automatic grinding wheel balancing, an exclusive Cincinnati feature, is included as standard equipment. Controlled by a lever reached from the operator's normal working position, the grinding wheel can be balanced within 20sec. without removing the wheel mount.

Basically, this system comprises three balls which take up positions according to the degree of imbalance and centralise the spindle while it is rotating and with the bearings unclamped.

LATE NEWS

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● from front page

FBI report

or grippers for holding the component. The working cycle of the loading and unloading mechanism is timed to travel to and from the conveyors and the grinding area while a component is being machined.

When the grinding wheel has finished the machining operation, the back-centre retracts automatically, and the workpiece drops a short distance on to locating vee-blocks on the machine bed and clear of the centres.

The unloading arm moves down, grips the component, and lifts it clear of the grinding area. Another component is then placed on the vees by the loading arm, and then retracts.

Travelling centre

The travelling centre now moves in and the pre-drilled female centres on the component locate in the machine centres and the grinding cycle commences.

Transfer of the machined component to the conveyor area now takes place and it is deposited on vees on the output-conveyor.

At the same time, the other arm picks up another component. It is then transported to the grinding area ready for the next loading/unloading cycle.

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